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MASS MANAGEMENT OF BURNS: CIVIL DEFENCE ASPECT.[1]

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THE subject for discussion this morning is the mass management of burns. As a profession we should clarify our ideas on the subject so that we may be in a position to advise those in authority on the set-up necessary to enable us to deal efficiently with the emergency that would be created by a peace-time or war-time disaster causing a large number of casualties with serious burns complicating their other injuries.

Such disasters have occurred in peace-time in other countries as a result of fires in cinemas, large emporiums or petroleum installations. Happily, with the exception of the Tarakan explosion and the Mount Lamington eruption, there have been no disasters in Australia involving more than a few cases of serious burns at any one time.

However, in war, as a result of the great advances made in the development of high-explosive, incendiary and atomic methods of attack, mass numbers of casualties from burns have become one of the most urgent medical problems, both in the fighting forces and in the civil community. The worst of these methods of attack is, of course, the atomic weapon.

As you will have seen by your programme, Brigadier A. W. Wardell, Director-General of Civil Defence, was to have delivered the opening address at this meeting, and it was hoped that he would have given us an indication of the circumstances under which we may be confronted with the problem of mass casualties from burns and of the organization required to cope with such an emergency. However, at a very late hour circumstances over which he has no control have made it impossible for his address to be presented, and at the request of the President of the Congress it became my task at very short notice to take his place. I trust, therefore, that you will deal leniently with any shortcomings in my presentation of the problem from the civil defence angle as it affects our discussion.

In the 150 years of her history Australia has been fortunate in that she has been practically free from the devastating consequences of direct enemy attack. This has been due primarily to our geographical situation and to the protection afforded us as a part of the British Empire.

[1] Read at a plenary session on "The Mass Management of Burns", Australasian Medical Congress (British Medical Association), Eighth Session, Melbourne, August, 1952.

But with the rapidly changing strategic situation, particularly in Asia, and with the approach of possible enemy bases nearer to our northern shores, together with the rapid development in the range and speed of aeroplanes, the advent of the super-submarine with a cruising range of many thousands of miles and capable of carrying and launching aeroplanes, the development of the long-range guided missile (which, as we have seen recently reported, can be launched from naval vessels, including the larger submarines, and can be fitted with atomic warheads), it seems certain that we cannot expect to enjoy the immunity from attack that we have had in the past. In a future war we must be prepared to cope with the consequences of such attacks on some of our densely populated centres of industry, attacks which may even be the opening gambit of a war.

It is essential, therefore, that as a nation we should be in a position to meet such a disaster with an organization that can cope efficiently with the large number of casualties that may suddenly result amongst our civil population, for a failure in this respect, with the consequent unnecessary loss of hundreds of thousands of lives, would have a disastrous effect on the morale of the civil community, which, in modern warfare, is at least equally as important as that of the fighting forces.

In considering the organization necessary, let us first consider the problem with which we may be faced.

As I have said earlier, the greatest emergency we may have to face is that created by an atomic attack, and if we make provision for that we shall cover all lesser contingencies. The enormous energy released by an atomic bomb takes three forms—heat, blast and radio-activity—all of which affect our problem in varying degrees. An atomic bomb may be used in several ways, but only one of them, the air burst, causes mass burns, and therefore the air burst is the only one that I shall consider.

When an atomic bomb bursts it produces what is termed a "ball of fire", which is an incandescent sphere having an initial temperature above 300,000° C. This cools rapidly and its thermal effects are all over in about three seconds. During this time exposed persons up to one mile from ground zero will receive burns of sufficient severity to necessitate skin grafting, and mild surface burns will be received at about two miles. In addition, persons trapped in burning buildings will suffer what may be termed flame burns.

The radiation hazard that affects our problem is what is loosely termed the "γ flash"; γ rays are emitted mainly by the fission products of the atomic explosion. This emission is significant for a period of about one and a half minutes, after which the fission products, which are drawn rapidly into the air, will have reached a safe height from the ground.

Radiation injury from these γ rays—which, as you know, has its most profound effect on the immature blood cells and the hæmatopoietic tissues of the body—may occur up to about one and a quarter miles from ground zero. Few casualties of this nature will exhibit immediate symptoms, and it would be wise therefore to assume that all casualties dealt with from this inner zone have, as an added complication, radiation injury, and that if they were within three-quarters of a mile of ground zero the radiation aspect will be severe, about 50% having received a lethal dose.

It may be well at this point to stress that radiation injury is a relatively small part of the problem of dealing with casualties from an atomic bomb burst in the air. In Japan only 15% to 20% of the surviving casualties were so affected, and in our cities, because of better shielding, this percentage could probably be halved. Moreover, the symptoms of radiation sickness will not become apparent for a few days up to six weeks following the explosion, the delay depending on the dose received.

So it cannot be too strongly stressed that the major problem that will confront us will be the handling of vast numbers of casualties from burns and trauma that will have occurred in the matter of seconds.

The actual number of casualties to be expected will vary according to the density of the population in the affected area, and in large cities there is a great variation at different times of the day. In the city of Melbourne, for example, the average daytime population of the area from Spring Street to Spencer Street and from Flinders Street to Latrobe Street is about 250,000. At midnight it is only 12,000.

It has been estimated that if an atomic bomb of the same size as that used at Hiroshima and Nagasaki was exploded at midday at the same height over the centre of the city, at the end of twenty-four hours the surviving casualties would be in the vicinity of 130,000, 70,000 of whom would be suffering more or less severely from burns.

Quite apart from the damage to the main medical installations of the area and the casualties amongst doctors and other medical personnel, the situation would be beyond the normal medical resources of the community in personnel, accommodation, transport and medical equipment and supplies. It is under those four headings that the civil defence organization for a metropolitan area is being considered.

It is obvious that doctors will be in short supply, and it will be necessary, therefore, to ensure that they are used in the most economical way. The training of an auxiliary nursing service is an important part of civil defence preparations, as are the training and organization of rescue and first-aid personnel, and scientists and technicians for work in the blood transfusion service. The Order of Saint John and the Red Cross Society, through their Joint National Committee, have submitted plans to the appropriate Commonwealth Government department concerning this training.

As it is probable that the main hospitals in the area will be damaged and the medical facilities at least temporarily disorganized, it is essential that suitable buildings on the periphery of vulnerable centres should be earmarked beforehand as emergency hospitals, and all the stores and equipment necessary to enable them to function rapidly should be procured and stored in the vicinity.

Apart from the usual drugs, dressings, hospital equipment, antibiotics and sulphonamides, the most vital medical supplies required in the treatment of mass casualties from burns are whole blood and its derivatives, blood substitutes and electrolyte fluids. As you are aware, the Red Cross National Blood Transfusion Service is responsible for the supply of whole blood and its derivatives throughout Australia. This service is able to meet all normal peace-time requirements for the civil community and the services, but can maintain a reserve of blood derivatives sufficient only to meet any foreseeable peace-time emergency. A plan has been submitted to the Commonwealth Government covering the extension of this service, which would produce a reserve of blood derivatives at the rate of 30,000 litres *per annum*. You will realize that such an extension would require the full financial support of the Government, and also a public statement covering the necessity for a nation-wide drive for additional donors. Even with a drive of this magnitude it would be several years before a stockpile sufficient to deal with a major war-time civil disaster could be acquired; so it would be necessary, in addition to this expansion, to build up a stockpile of blood substitutes.

If it is expected that a major war will occur within the next few years, it is vitally important that this expansion of the Blood Transfusion Service be immediately put into action, as it is impossible to acquire blood derivatives from anywhere abroad, and there would be great difficulty in acquiring any large quantity of blood substitutes.

I expect that these problems will be more fully dealt with by other speakers in this discussion, and my aim simply has been to give you some broad idea of the emergency with which we may be confronted and of the advanced preparation necessary to enable us to deal with it, and to stress the time factor entailed in these preparations and the vital necessity of immediate action if a major war is to be anticipated within the next few years.

MASS MANAGEMENT OF BURNS: ORGANIZATION OF THE MEDICAL SERVICES.[1]

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IN this paper it is intended to discuss briefly some of the problems affecting the medical services in the field when confronted by large numbers of casualties due to burns. Although this discussion is based on the army organization, the air force problem in certain locations would be similar. The navy is a separate problem, and no attempt will be made to deal with it in this paper.

Today there are several types of weapons among those still called "conventional" which can cause large numbers of casualties due to burns, sufficient to embarrass any field medical organization. There are flame throwers, napalm and incendiary bombs *et cetera*, weapons which are being used in Korea today against the Chinese Communist forces. However, the number of casualties so caused fades into insignificance when compared with the number which may be expected as the result of atomic weapons.

Whether atomic bombs would be used against forces in the field is still under discussion, but such use is now feasible. You all no doubt read the newspapers and have seen reports that American troops have passed through areas blasted by atomic bombs only a very short time after the explosions. Another atomic weapon is about to make its appearance, and if one can believe the same source of information, the Press, atomic warheads for shells, rockets *et cetera* are no longer theoretical fancies. This means that casualties due to such explosions in the field are a distinct possibility in any future global war.

The number of casualties inflicted upon army field forces by an atomic bomb would probably be very much lower than those received by a city population. On the other hand, because of the lack of buildings, the proportion of burns to blast injuries would be higher in the field. It is further complicated in that casualties due to other forms of war wounds would still be occurring. It is reasonable to expect that there would be some 4000 to 8000 burn casualties in a reasonably concentrated divisional area, depending on the terrain, state of digging-in, alertness and training. Because of the protection afforded in a well-dug-in position with well-disciplined troops, the ratio of severe to less serious burns could be expected to be approximately 1:3, whereas in an area where digging-in had not occurred the ratio might possibly approximate 4:3. These figures are purely conjecture and are therefore open to criticism. Undoubtedly some blast injuries would occur, but these would be less in proportion to the burns.

The problems created by the receipt of such large numbers of burn casualties are therefore as follows: (i) first-aid treatment of the burns; (ii) classification, evacuation and distribution of the casualties; (iii) surgical treatment and further disposal. Only the first two problems will be dealt with here.

First-aid treatment consists of relief of pain, the application of dressings, an endeavour to prevent infection and dehydration, and relief of shock. Classification into the following groups will be necessary: (i) severely burnt casualties; (ii) moderately severely burnt, but still requiring evacuation; (iii) less seriously burnt, able to remain on duty for some time. This last group will probably be needed to fight on, as the enemy would surely follow up such an explosion by an all-out attempt to break through. Evacuation of the casualties would be carried out by means of ambulances, troop-carrying vehicles, ordinary trucks *et cetera*.

To carry out these tasks the following resources would be needed: (*a*) personnel, (*b*) equipment, (*c*) transport, (*d*) medical establishments.

[1] Read at a plenary session on "The Mass Management of Burns", Australasian Medical Congress (British Medical Association), Eighth Session, Melbourne, August, 1952.

Personnel.

Personnel can be divided into two groups—those affected by the explosion and those coming into the area to succour the wounded. The former are included because one of the most important means by which the disaster can be alleviated is by self-help. In other words, each member should carry some sort of first burns dressing. As the hands and face are the most likely to be affected in the minor cases, some type of glove dressing could be used for the hands, which would be immediately applied in the minor cases, so that such members would be enabled to fight on.

The personnel coming into the area could again be divided into two groups—those concerned with the purely medical work and those to look after the feeding, water, shelter, latrines *et cetera* for both casualties and medical personnel.

The medical personnel would be divided into teams who would carry out first-aid treatment, classification and evacuation. It is suggested that each team would consist of four—a non-commissioned officer in charge, two nursing orderlies and one other member. Every five or six such teams would be in charge of a medical officer.

These personnel would come from field units outside the area. Such units as field ambulances, field dressing stations and casualty clearing stations would take part in providing these teams. Care would be necessary to ensure that medical units were not denuded of personnel so that they would be unable to carry out their function of providing care for the casualties on the line of evacuation. It is as well to remember, too, that other casualties would be occurring at the same time and also needing urgent surgery. It is unlikely that any teams would be able to be formed by the field ambulances in the affected area.

Each group of teams under a medical officer would be allotted a sector in which to work, and the whole area would be coordinated by a senior medical officer—probably the commanding officer of the field ambulance in reserve. It is estimated that each team could deal with three or four severe burns or 12 to 15 less severe burns in one hour.

In order that these personnel should be able to carry out their work efficiently, they would have to be highly trained in the first-aid treatment of burns, be able to administer morphine and antibiotics, and be skilled in giving fluids intravenously. All members of the defence forces should be trained in self-help measures in the first-aid treatment of burns.

Equipment.

The necessary equipment to carry out such a plan includes dressings, morphine, antibiotics, fluids for intravenous administration (serum, serum substitutes, saline *et cetera*), blood, stretchers, blankets *et cetera*. All these must be kept in strategic areas, so that no matter where such casualties occur sufficient equipment can be readily available.

Dressings are a problem. The size of dressings has been under investigation by both the United Kingdom and the United States of America for some time. Large dressings in two sizes (36 inches by 22 inches and 22 inches by 18 inches) are being given a trial overseas. It would appear to me that perhaps three types of dressings may be necessary—a large size, a medium size and a small size or first burns dressing. Each team as outlined above should have equipment to deal with 100 casualties, and the dressings should be made up of one-third large dressings, one-third medium and one-third small.

The actual type of dressing is still not finally accepted, but it will probably be of the absorptive type.

Morphine should be in the form of "Syrettes", and the amount to be given should be at least one-third grain. The antibiotic of choice at the moment I leave to the surgeon to decide.

The supply of fluids for intravenous use presents the greatest problem of all. This is to be dealt with in detail by others, but it is interesting to estimate how much would be needed in such a situation as has been pictured here.

If we consider the casualties with severe burns to need an average of six pints of plasma and six pints of saline each, then it is possible that one atomic incident alone may make necessary some 25,000 to 30,000 pints of plasma, not including whole blood, which is absolutely necessary. It is obvious that some type of plasma substitute, such as dextran, will be needed to cope with this demand. Blood, which is of great importance in burns, would not only be received from the main supply area—that is, Australia—but would also be collected from the soldiers in the rear areas. All soldiers are blood grouped, and such a collection would give quite a large supply of blood of all groups—but still insufficient to cope with this one incident.

Transport.

Transport would not present an insuperable problem. Ambulances would be needed for the severe casualties, whilst the others could be carried in troop-carrying vehicles and other vehicles of all kinds. It must be remembered that first aid *et cetera* would be going on for a considerable period in the area—up to twelve hours; therefore, provided medical installations (for example, casualty clearing stations) were within reasonable distance, the pool of all available ambulance and other transport vehicles should be able to deal with the first link in the evacuation chain. Motor ambulance companies (Royal Australian Army Service Corps) would be needed well forward in anticipation of such an event; the number of ambulance cars in a motor ambulance company is 90, and there are 30 troop-carrying vehicles. Thereafter aircraft and hospital trains would be needed to distribute the casualties further along the lines of communication.

Air evacuation of casualties has revolutionized medical care in the field. It would be invaluable here to distribute severe casualties to those hospitals which could adequately cope with large-scale plastic surgery. Aircraft would probably evacuate many of these casualties within a short time to the mainland.

Conclusion.

This has been necessarily a very brief attempt to give you an idea of how the medical services could be organized to overcome the effects of an atomic bomb attack in the field. Any lesser number of casualties would be easily dealt with by an organization prepared for the larger catastrophe.

To summarize, it is essential to have the following requisites if an army is to be able at least to attempt to deal with mass casualties due to burns: (i) Adequately trained personnel—both combatant and medical—are required, both for self-help schemes and in order to help their comrades. (ii) There must be an adequate stockpile of serum, serum substitutes and other solutions for intravenous use, as well as dressings and other necessary medical equipment and supplies. (iii) A firm direction must be given as to the method of treatment of burns. (iv) All stockpiling should be completed before a war comes, or else the casualties will occur when essential equipment is not available. This can lead to disaster and may even cause defeat.

It can be seen that all the basic factors outlined in this paper are indeed similar to those needed for a civilian disaster due to atomic explosion.

No mention of radiation has been made in this paper. It may complicate the picture considerably, and in its presence classification may have to be modified. In the treatment of this condition much more whole blood will be needed.

Acknowledgement.

I wish to thank the Director-General of Medical Services, Major-General F. Kingsley Norris, C.B.E., D.S.O., E.D., M.D., K.H.P., for his invaluable help and for allowing me to publish this paper.

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MASS MANAGEMENT OF BURNS: SURGICAL ASPECTS.[1]

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BURNS have been sustained by man since fire was invented. In past ages many thousands of human beings have been consumed by fire. In modern war mass burning is to be expected, whether by atomic bombs, napalm or liquid fire. Even in quiet times of peace mass burning occasionally occurs, as from fires in buildings.

Experience has shown that when such disasters occur, all the resources of medicine may be taxed to the utmost. Gone are the fine distinctions between physician and surgeon, dermatologist and urologist. All qualified doctors may be urgently required. None can sit back and claim that age, lack of experience or superior skill in another field excuses them from their duty in the crisis. It is therefore fitting that the subject should be discussed at a plenary session of Congress.

It may be argued that there is no need to treat such a matter seriously in this remote corner of the world. Apart from the possibility of an atomic catastrophe occurring here, there is the probability that in the event of war some of our medical men would be required in other parts of the world and have just such a situation to face. Burns should not remain the Cinderella of surgery, but be of vital interest to all practitioners of medicine. The order of treatment of the subject will be as follows: (i) organization of medical personnel and assistants; (ii) first-aid measures; (iii) formal treatment of the patient—(*a*) general (shock *et cetera*), (*b*) local (the burn). Stress will be laid on surgical organization—the treatment of the patient rather than of the burn.

Organization.

It is presumed that the civil defence authorities would provide directions for evacuating casualties, transport, and some auxiliary service of supply of comforts—for example, hot drinks, such as tea.

Some medical personnel would be under the direction of the ambulance service. A greatly enlarged lay service would be necessary. Thousands of civilians should be available from the periphery of the stricken area. It becomes imperative that instruction in the elements of first aid and in the discipline of ambulance work should be imparted to all adults in the community. All self-respecting citizens should be taught to play their parts in the crisis, just as they are taught to swim. Self-help is essential. Every person's blood should be grouped—not in detail, but for the four main groups—and everyone could wear an identity disk or other suitable mark, indicating the blood group. Blood would thus be available "on the hoof" in great quantity.

At a meeting of specialist medical advisers to the American Red Cross, held in Washington in December, 1950, I was privileged to be present, and heard this matter discussed at length. Blood—not stock-piled substitutes—was given prime place. A search for the best substitute is in train.

Nurses, voluntary aid detachments, Red Cross volunteers, boy scouts and members of similar organizations should be trained in simple methods of infusion, so that under medical direction they could carry out the procedure of transfusion, give injections of morphine, and apply dressings, as part of the elective treatment.

First-Aid Measures.

The injection of morphine (one-quarter, one-third or one-half grain) if pain, hysteria or restlessness is severe, is the most humane first-aid measure. It can be applied to those who are hopelessly burnt, as well as to those with

[1] Read at a plenary session on "The Mass Management of Burns", Australasian Medical Congress (British Medical Association), Eighth Session, Melbourne, August, 1952.

a reasonable prognosis. Some severely burnt casualties would not require morphine. Morphine in great quantity should be available. Intravenously administered morphine is more effective for very shocked patients, but it may be difficult to find a vein.

There would be a zone indicated by the civil defence authority into which it would be useless to enter with the object of saving life. Many fellow citizens in this zone would crave for some comfort, and it seems reasonable to temper the ruthlessness which of necessity must be exercised by the directors of the service, with a compassionate regard for the individuals affected. Morphine and drinks would be welcomed by the doomed.

Great care would be necessary to see that a 22-stone man with a 5% superficial burn was not carried on a stretcher for miles. Strict supervision would be required in the selection of patients for the following classifications: (*a*) urgent—first-aid treatment and transfer to hospital (stretcher casualties); (*b*) urgent—walking casualties; (*c*) less urgent—hopeless casualties; (*d*) less urgent—patients able to take care of themselves.

First-aid dressings will be dealt with under the heading of hospital treatment, as such dressings will be part of the elective treatment of the burn. It might not be possible to supply the standard dressing as first aid. Clean linen, a pillow case, a sheet *et cetera* could be used. The burn wound is relatively sterile for some time.

The organization of transport and first-aid depots and the control of personnel would be a function of the civil defence authority. Medical men would be organized as a body and would act under proper directions so that the maximum efficiency would result.

It is not proper to elaborate further on this important subject of organization, without which there can be no effective treatment of mass casualties.

Formal Treatment in Hospital or Casualty Clearing Unit.

A search of the recent literature on the subject of treatment, together with my limited experience in charge of a unit of a general hospital and some experience of burns casualties in war, prompts me to make some tentative generalizations.

Organization is the keynote. Give Nature a chance. Simplify treatment—act under orders as would the fireman.

Early death occurs from shock. Suspect shock in burns affecting 15% of the body surface of adults, and less extensive burns in children. Babies and children stand burn injury well if proper treatment is adopted. Many patients aged over sixty years die from conditions not related to the burn. If 50% of the body is burnt deeply, recovery is rare. Thirst is intense, therefore fluids given orally, such as hot sweet tea, are of great value—villi before veins if possible. Sodium bicarbonate solution and sodium chloride solution given orally are of some value. Intravenous therapy would be practised where necessary and circumstances permitted.

The "rule of 9" of Berkow is an accepted method of estimating prognosis whether the burn is superficial or deep, as well as a useful guide for planning intravenous therapy—head 9%, upper limbs each 9%, lower limbs each 18%, trunk 18% (front and back each 18%), and 1% for the perineum. Evans's formula for a 70-kilogram man (11 stone) with 35% burns is as follows:

Plasma or its substitute (dextran), 70 × 35 × 1·0 millilitre = 2450 millilitres.

Electrolytic solution (0·9% sodium chloride), 70 × 35 × 1·0 millilitre = 2450 millilitres.

Glucose (5%) in water = 2000 millilitres.

This amount is given in the first twenty-four hours; half of this quantity is given in the second twenty-four hours.

Sodium chloride is to be used sparingly in the later stages, and at all times in the treatment of patients with respiratory involvement, so as to prevent pulmonary œdema. Whole blood is advocated by Blocker—no other fluids being given intravenously, or saline given orally, or bicarbonate solution being administered. Blood is required for patients with deep burns, especially in the later stages, and can be used alone or in equal quantities with plasma. Hæmatocrit readings are deceptive, even if practicable. In fact, in an atomic catastrophe blood might be the most easily available, and the most useful material. Stocks of plasma would run out.

In selected cases the indwelling catheter would be useful, an output of 50 millilitres per hour of urine indicating adequate therapy. If the hæmoglobin value is above 19 grammes *per centum* and the urine output is below 25%, intravenous therapy is speeded up.

This subject is one for a specialist in resuscitation and is dealt with by another speaker. Doubtless a standard procedure suitable to conditions in this country would be planned and instruction issued accordingly. Yet it is so important that it must be regarded as surgical treatment. Only after shock, the initial killer, has been combated, or its treatment is under way, is it reasonable to interfere with the burn wound. Some burns would have already been dressed at first-aid stations with a single piece dressing (one inch thickness of absorbent dressing), used by the army—that is, on the limbs and body. Others would have been allowed to remain open—that is, burns on the head and neck, perineum and buttocks. No further treatment would be necessary, at least in the first week. The closed method and open method both have merit. Either would be adopted as circumstances dictated. In practice the open method would be extensively used. Some patients with unilateral body burns would be treated by the open method. Hand burns would be best treated by the closed method (the use of a glove).

The open, or exposure, method is not just a poor substitute for other methods, but is strongly advocated by Wallace and others for all burns under civil conditions. The burn wound becomes dry and there is a minimum of infection; the wound does not become reinfected; it drains through cracks in the crust. Superficial burn wounds so treated heal rapidly, and deep wounds have less infection. There are an absence of "burn odour", absence of a toxic and infective phase, reduction of physiological complications, small morphine requirements, less acute need of blood and protein intake, less weight loss and better mental outlook. A patient's distress at the sight of his injury is lessened by the company of others in a similar plight.

I have seen this method adopted in New York, especially in combination with ACTH and cortisone treatment; I was amazed at the results. We have had a few patients in our wards at the Royal Melbourne Hospital under a similar *régime*, and I am impressed with its simplicity and with the relief of the staff as well as of the patient.

ACTH in a dose of 120 milligrammes daily prevents pyogenic membrane formation in deep burns. Cortisone (100 milligrammes daily up to a total of 450 milligrammes) has been used in my clinic, and we consider that the results are better than those obtained prior to its use. Hyperthermia is certainly controlled.

Obviously in the mass management of burns it would be possible to treat only a few patients with those rare drugs. It would be unwise to regard them as standard drugs pending further investigation. Some authorities find little use for these substances.

Antibiotic therapy would be necessary for patients with deep burns (penicillin 300,000 units every six hours, and antitetanic serum 3000 units). These valuable substances should be conserved for patients with deep burns and a reasonable prognosis, or with complications of other injuries.

In all hospitals and dressing centres great care would need to be exercised by all concerned, so that valuable blood, plasma, dextran or other substitutes and antibiotics were not squandered.

No mention has been made of *débridement*, clearing up under anæsthesia *et cetera*. Such treatment would not be possible under mass conditions even if it was desirable.

The later treatment of the burn wounds could be undertaken more formally. Separation of sloughs could possibly be aided by the new vegetable collagenases. In any case, the older and well-known methods of treating infected wounds would apply.

Blood would be required. Skin grafting would be carried out as early as possible, the postage stamp or Thiersch graft being the most useful for general application. Antibiotics for parenteral and topical use would be useful. The amount of routine surgical treatment would tax the resources of specialists, and it would be well to have a large number of medical men available who had had some experience of this work or who would place themselves under specialist direction.

In the treatment of patients with irradiation burns no surgical procedures should be carried out after the first week and no elective surgery for six months. Irradiation sickness, intestinal ulceration, pancytopenia, marrow aplasia, lowered resistance to infection—all these would contribute to many later fatalities. Blood transfusions and antibiotics would be of no use in those cases.

Future generations of men would have more than a mere written record of the catastrophe.

Whether or not a special centre for the aseptic treatment of burns would be of practical value in a disaster is dubious. It may be that it would stimulate interest in the subject and ultimately prove of value. There is no such centre in Victoria at present.

Conclusion.

In concluding this paper I submit that in a time of such great emergency there would need to be a judicious combination of sense and sentiment, a realization that many patients could be killed by too energetic treatment, that many left to Nature might recover. An organized medical profession could salvage much from the wreck. Therefore I have favoured simple methods of treatment, as they would be the most easily applied, and perhaps obtain a better over-all result.

THE MASS MANAGEMENT OF BURNS: RESUSCITATION.[1]

By R. J. WALSH,

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MULTIPLE cases of burns could occur in peace as a result of theatre or night-club fires, or in war as a result of incendiary or atomic bombing. The occurrence of even a few hundred peace-time casualties would demonstrate how ill-prepared we are to treat the victims of a serious enemy air attack on one of our major cities. One has only to recall the devastation of Hiroshima and Nagasaki to realize the chaos that results from atomic attack, and modern types of high explosives and incendiary bombs now being used in Korea are said to be more destructive than were those used in World War II. If enemy attacks are considered likely, the need for preparation is obvious.

The medical care of burnt patients cannot be discussed without mention of the fact that in almost any situation producing multiple cases of burns traumatic injuries are at least as frequent as thermal injuries and require appropriate treatment. In modern warfare the hazards of irradiation may also be encountered, a danger which is greatest amongst a civilian population. Any plan of preparation must be integrated into a broad plan of civil defence, which must include establishment of treatment centres, evacuation and transportation of the injured, provision of trained medical, nursing and first-aid personnel, and the supply of equipment and materials. More specifically with regard to burnt patients the following medical aspects require consideration: (i) first aid, (ii) resuscitation, (iii) control of infection, (iv) restoration of function.

The prognosis of the individual patient with extensive burns has improved considerably in recent years, mainly owing to advances in shock therapy, to a better understanding of salt and water metabolism, to the use of antibiotics and to improved facilities for nursing care. It would be futile to anticipate the refinements of modern civilian hospitals after an atomic attack or even in peace if multiple cases were to occur as a result of a major disaster. The problem, therefore, is to consider how best the modern therapeutic achievements can be adapted to the treatment of hundreds or thousands of burnt patients under disaster conditions Each of the aspects mentioned above is deserving of close attention, but this paper is confined to the problems associated with resuscitation; first the requirements of these patients will be outlined and then the way in which they could be met will be discussed.

General Principles of Resuscitation.

However desirable, if not necessary, it may be in peace, individual variation of treatment could not be countenanced in circumstances associated with a serious shortage of skilled medical attendants. Under disaster conditions simplification and standardization of therapy are essential, and it is submitted that the following general principles should apply:

1. Any adult with burns covering more than 18% and any child with burns covering more than 7·5% of the body surface should be marked for shock therapy, and this therapy should be commenced as soon as possible after injury.

2. The chances of survival are more directly related to the area of the burns than to their depth, and survival is extremely doubtful under disaster conditions if more than 50% of the body is burnt.

3. The resuscitation of burnt patients with intravenous therapy is usually controlled in civilian hospitals by clinical observation, by estimations of the pulse rate and blood pressure and by hæmatological tests. Under disaster conditions it would not be possible to provide the personnel required for this skilled clinical observation. The amount of fluid to be administered must be calculated by some simple method, and the most satisfactory is that based on the area of the body burnt. It must be admitted that there are dangers in such standardization, because some patients would receive too much fluid and risk circulatory overloading, whilst others, especially those with deep burns, would not be fully resuscitated. However, a departure from the usual principles of medical therapy would be essential, and the aim would be to achieve the best for the greatest number of victims rather than the best for the individual. This would be possible only if therapy was so simplified that it could be undertaken by a large number of relatively inexperienced people.

A knowledge of the area of the various parts of the body is therefore essential so that the percentage of the surface area involved can be rapidly calculated. A diagram such as that shown in Figure I or that used by Wallace (1951) would assist in this regard, and should be printed or stamped on civil defence dressing cards. Its employment in civilian hospitals for all cases of burns would provide training and experience in its use for members of the medical and nursing professions, and its inclusion in first-aid training manuals would increase the number of useful assistants in emergencies.

4. It is suggested that the total amount of fluid to be administered to a burnt patient might be calculated from the following formulæ: (*a*) adults: 150 millilitres for each 1% of body surface burnt; (*b*) children aged over five years: one millilitre of fluid per pound of body weight for each 1% of body surface burnt. No simple formula is offered for infants aged less than five years, who should receive as much individual attention as is possible in the circumstances.

[1] Read at a plenary session on "The Mass Management of Burns", Australasian Medical Congress (British Medical Association), Eighth Session, Melbourne, August, 1952.

The rate of administration of fluid should be as follows: first eight hours, 50% of the total; next sixteen hours, 25% of the total; second twenty-four hours, 25% of the total.

Type of Fluid Required.

Before the types of fluid required by burnt patients are considered, it is necessary to mention briefly some of the pathological features at the site of the burn (Figure II). Fluid is lost from the circulation in blister fluid, in surface exudates and into the tissues surrounding the burn with the production of œdema. The loss continues for at least forty-two hours. It has been demonstrated that the exuded fluid has a similar electrolyte content to that of plasma but a lower protein content. The deeper the burn, the greater the destruction of red cells in the blood vessels and the more pronounced the anæmia that occurs.

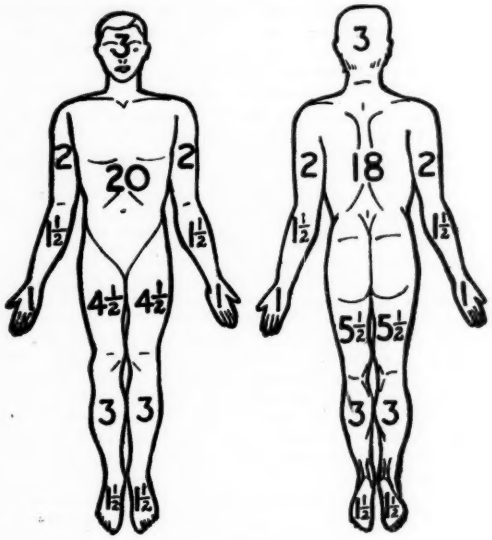

FIGURE I.

For these reasons the physiological state is appropriately restored by infusions of serum, blood and saline. It is impossible to define accurately the proportions of each, but it is suggested that the scheme in Table I would meet the requirements of the majority of patients.

It is unlikely that either blood or serum would be available in amounts adequate to meet the needs of a sudden enemy attack on one of our cities. The use of substitutes or plasma volume expanders must therefore receive careful consideration. Since the First World War a search has been made for a non-toxic, non-antigenic, stable and readily sterilized material which is retained within the circulation. Two materials, dextran and polyvinylpyrrolidone, are now being extensively investigated, and both appear to be satisfactory. The use of at least one would be essential under disaster conditions, and at present dextran is the more generally favoured. Experience has shown that it may be administered safely as the basis of resuscitation in burns; but if any blood or serum is available, the amount of dextran should be limited to six bottles per patient. It is, however, frequently difficult to group and cross-match the blood of patients who have received dextran unless blood for the purpose has been obtained prior to infusion.

Adjuvant Therapy.

The role of ACTH and cortisone in preventing fluid loss in burnt patients is still not clear. It has been suggested that the amount of fluid required intravenously may be considerably reduced if these hormonal drugs are given shortly after the accident. Some workers have been unable to confirm this claim, and at the present time difficulty of procurement makes contemplation of their use in wartime disasters impracticable except for a limited number of patients. Moreover, it has been stated that their use delays healing and encourages infection of the burnt area.

This paper is not concerned with the prevention or therapy of the "toxic" phase of burns, which occurs from the third day onwards. In civilian life the majority of patients who die from burns do so in this phase, the mechanism of which is not understood. It is possible that ACTH and cortisone may be of value, and if this should be demonstrated all available supplies should be reserved for the purpose.

Preparations Required.

Even if simplified methods of resuscitation such as those suggested were adopted, it must be admitted that at the present time we could not hope to deal efficiently with the victims of an enemy attack. We lack materials, personnel and plans, and we would witness the deaths of thousands who might have been saved if we had been prepared. To care for 10,000 casualties with burns—a small percentage of the number caused in Japan by the atomic bomb explosions—it is conservatively estimated that we would require *inter alia* 400 to 500 doctors, 4000 to 5000 nurses, 40,000 to 50,000 units of dextran, 20,000 to 30,000 units of blood and serum, and 10,000 to 15,000 units of crystalloid solutions. The estimates of personnel do not include first-aid and transport workers. From the resuscitation angle it is suggested that preparation should be made as follows: (i) Preparations which are part of the general civil defence programme, and which should be implemented as soon as the danger of enemy attack is envisaged: (*a*) the acquisition of a decentralized reserve of serum or blood fractions; (*b*) the manufacture or importation of large quantities of dextran, to be stored in strategically safe but easily accessible sites; (*c*) the provision of a similar reserve of equipment, in particular apparatus for the intravenous administration of fluids; (*d*) the training and organization of medical, nursing and first-aid personnel. (ii) Plans to be implemented immediately an attack occurs: (*a*) immediate mobilization of all available trained personnel; (*b*) mass collection of blood from donors in all parts of the Commonwealth.

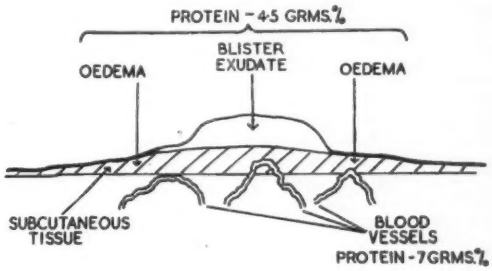

FIGURE II.

TABLE I.
Ideal Therapy.

Type of Burn.	Proportions of		
	Serum.	Saline.	Blood.
Superficial	2	1	0
Deep	1	1	2

The problem of providing personnel is aggravated by the inexperience of medical graduates in dealing with extensive burns. In civilian life the relatively few patients with serious burns are treated in the larger centres by a few

medical graduates. These trained persons will be exposed to the greatest risk in the event of an enemy attack, and may not be available when required. The inclusion of lectures and demonstrations in all post-graduate courses would contribute a little to the problem. The establishment of a "burns centre", as suggested by Colebrook, in each capital city would assist in training personnel and in allowing controlled trial of the various methods of resuscitation. In the event of a major disaster, medical personnel would be of the greatest value in assessing the severity of injuries and burns and in prescribing therapy. First aid and resuscitation treatment would, of necessity, be the responsibility of non-medical personnel, and for this reason the training of nursing and first-aid groups should receive attention.

The stockpiling of serum, dextran and equipment requires time. If incendiary or atomic attacks are even a remote possibility, this phase of preparation should commence as soon as possible. A final point is that very large amounts of blood may be needed for transfusions, especially if therapy of irradiation effects is required in addition to that of thermal and traumatic injuries. If a large number of casualties occurred it would be impossible to anticipate supplies of blood from the area subjected to attack, in which all persons capable of collecting blood should be concerned with the administration of fluids. Plans must therefore be prepared for mass blood collection in all parts of the Commonwealth immediately after the occurrence of a disaster.

Summary.

It is held that the medical profession should be organized to care for numerous patients with extensive burns, whatever the cause. At present we would be unable to cope efficiently with more than a few such patients. The profession can contribute a great deal to any plan of preparation; but the responsibility for its initiation, for its organization and for the provision of materials, involving considerable expense, must rest with those directly responsible for the defence of the country.

Reference.

Wallace, A. B. (1951), "The Exposure Treatment of Burns", *The Lancet*, Volume I, page 501.

THE LABORATORY ASPECTS OF MASS MANAGEMENT OF BURNS.[1]

By J. W. PERRY,
Melbourne.

LABORATORY procedure for mass burns casualties, if within the traditional scope of laboratory activity, will commence after the casualties' admission to hospital.

It is unlikely that the dimensions of the casualty problem will affect this principle, the rigidity of which is dictated by the relative lack of mobility of laboratory facilities. This statement looks at the problem from the laboratory angle; therapeutically burns become a laboratory problem when the effects of electrolyte, fluid and protein loss are manifest, and later when infection occurs. For these to be treated, admission to hospital is desirable, if not essential.

It is clear that what is desirable and what is possible in times of critical emergency may be poles apart, and this problem of the organization of laboratory services should be approached from two points of view: the ideal and the compromise.

Let us accept that much improvisation would be necessary with numerous casualties, the ingenuity of which will be appreciated only in retrospect, and let us accept also that much planning can be done with the facts already available.

Before we discuss plans which must be made on hypothetical numbers of casualties, what of facilities already available in capital cities of Australia? If we take Melbourne as an example of a typical capital city, a survey of departmental heads in large hospitals, both private and public, indicates that laboratory facilities would be hopelessly inadequate if, say, fifty subjects with burns requiring laboratory attention were admitted to any one of them.

This figure is a generous one, as many have stated that less casualties would result in laboratory chaos. However, if this figure is used, something less than 500 burn casualties admitted to hospital at the one time would completely clutter up hospital laboratories in Melbourne. It is hardly necessary to add, if they could be admitted to hospital in the first place. All the institutions concerned are somewhat inelastic in the provision of extra facilities, if not from staff, then from space limitations.

A survey at the present will produce evidence that even for ordinary routine work adequate resuscitation control is strained because of the lack of adequate biochemical equipment. If we are to make recommendations as a result of the communications in this section, existing facilities for routine activities warrant investigation.

In the realm of civilian routine a major fire accident in a crowded public place could result in as many as 500 casualties. Our lack of ability to cope with this number in laboratories indicates that unpreparedness is a tribute to our confidence in our all-round protection against such hazards. At any rate, in peace-time our economy is too rigid to allow for 500 anticipated cases of severe burns.

Confidence and economy are replaced in the presence of incendiary and atomic bombs, weapons with which our organization will have to deal. Previous speakers have elaborated the extent of devastation from centres of atomic explosion. I shall base my calculations on the assumption that some 35% of all casualties would be burns of some sort. The National Research Council of the United States of America in its symposium on burns indicates that in target cities 10,000 to 50,000 casualties may be expected, 3500 to 17,500 from burns, of which some 50% may be selected by medical teams as suitable for evacuation and treatment.

The problem of accommodation is gargantuan, and it may be that in addition to the surviving hospitals nearby building blocks would have to be surveyed and pre-equipped to cope with hospital treatment. At any rate, every available laboratory effort would have to be exerted to cope with the situation, and I suggest that unless we depart radically from conventional channels of expansion in the civilian or army sense there would be no hope of coping with the problem.

Having suggested a radical departure, let us investigate the possibilities. We must accept that skilled selection of casualties as suitable for treatment will limit the strain on all resources, and it will be fortunate if one-third of the burns casualties receive adequate attention. The reserves of the metropolis, if totally mobilized, might minister adequately to a maximum of 5000 burns casualties—a bewildering figure at the moment, but, it is hoped, less so after organized preparation.

The ideal for this would be 25 adequately equipped laboratories for biochemistry and bacteriology. About nine laboratories exist, some adequately staffed and equipped. At least 15 more would be required. Some of these would be static and some mobile, with the view that the static ones might have to be written off at the time of the disaster. Mobile laboratories would be independent units, but capable of being used in a cumulative manner in the event of large evacuation centres "mushrooming" as order began to appear out of chaos. The equipment required for such a mobile unit should be complete, each unit consisting of two semi-trailers equipped as bench laboratories and provided with both expendable and non-expendable equipment. Two 30-hundredweight trucks as auxiliaries to each of these would carry field sterilizing and generating equipment, and two semi-trailer units would be attached to each, also four such vehicles as jeeps. One mobile unit would

[1] Read at a plenary session on "The Mass Management of Burns", Australasian Medical Congress (British Medical Association), Eighth Session, Melbourne, August, 1952.

therefore consist of two semi-trailers, two 30-hundredweight trucks and four jeeps.

Staffing is the next problem. One medical officer and seven technicians would be a minimum.

Bench equipment should include a portable flame photometer, together with other equipment for the routine control of acid-base, water and osmotic equilibrium.

These laboratories would be prepared for conversion to mobile blood-taking units or operate as both, and in this regard the planning of resuscitation services will have to be in close liaison with laboratory organization. The limited medical knowledge of a laboratory technician will be lofty in comparison with the helpless ignorance of the confused populace, and therefore he must be made as versatile as possible, ready to aid in immediate treatment, resuscitation, evacuation, blood-taking and reorganizing. This will be possible if the call for his laboratory duties diminishes in priority in the face of grave devastation, as obviously it will.

Interchangeability and complete cooperation of medical potential must be the keynote of any organization based on the accumulation of independent units. It must be remembered that even if demands for laboratory aid in the field of mass burns were negligible at first, as chaos diminished traditional techniques would reappear and many lives would be saved by adequate control of intravenous and other therapy. No one would be more scornful, and justifiably so, than the medical officer confronted with hundreds of burns, of the pathologist who wanted to make a survey of serum electrolytes. Most pathologists at that time would be more than occupied at the side of the medical officer.

It is not to be forgotten that the metropolitan hospitals might no longer exist after the disaster, and that these mobile centres might be all that was left of laboratory services to the community.

What are the implications of such a plan as this? The provision of skilled personnel is undoubtedly the greatest problem. A laboratory must have an efficient medical officer in charge, preferably one with a knowledge of laboratory procedure. This technical staff could be built up from people with little or no past experience, but at least one skilled technician should, with the medical officer, form the nucleus of each unit.

Some of my recommendations will be open to criticism on the grounds of inadequacy, and I make them well aware of this, but with a plea for tolerance in the interest of both expediency and economy.

I have suggested 15 extra laboratory units requiring a staff of some 90 personnel—15 medical officers and 75 technicians. This is a tall order if they had to be mobilized tomorrow, but not so tall if we examine the potential in existing laboratories of those people not engaged in biochemical or bacteriological work, whose daily work requires no knowledge of these subjects, but who could as from now be learning selected techniques required in an emergency.

The technical skill of industrial laboratories, of technical schools, of university departments, and of senior school boys whose future lay in the direction of chemical procedures, could be assessed and tabulated. It is from these sources that emergency technical help must come.

The first unit could be made as a prototype and immediately put into action. This could be achieved by selecting a medical officer from a university department or from an existing laboratory, or one from the ranks of private practice. He would select a technical assistant already trained and six other personnel. Each one would be given three months' leave of absence on full pay and the unit would park itself adjacent to a large metropolitan hospital and be fed with appropriate tasks and given valuable assistance in training and routine. Other units could be established where large hospitals could accommodate them and be used as base schools for training.

As has been emphasized previously, integration of potential—field medical laboratory and resuscitation—is necessary, and the organizer of the last-mentioned must try to make clear how he intends to use for his own purposes these laboratory units as additional strength to his own organization.

I have spoken of a plan based on an imaginary calamity in our own community, and all recommendations have been made with an eye on the ideal, but influenced by the restraining hand of compromise.

Much of what I have said forms itself into agenda for discussion of laboratory aspects of the general plan of organizing defences against mass casualties. If it achieves only this, then it has been worthy of your attention. Any enthusiastic plan of preparedness must, however, not be too inelastic, nor should it be developed to the extent of lavish extravagance.

Experience in the past has shown that although "it cannot happen here" is a slogan to be deprecated, in fact it did not happen here.

Reviews.

MEDICAL INSPECTION OF SCHOOL CHILDREN.

"THE MEDICAL INSPECTION OF SCHOOL CHILDREN" by the late E. H. Wilkins is not just a book on medical inspection in the ordinary sense, but an inspiring volume which can be read with profit by everyone engaged in this branch of medical work.[1] Instead of considering only the more obvious problems as presented by the examination of the child himself, the author emphasizes the child's environment to show how the abnormal conditions may have arisen. Only by a complete knowledge of these environmental factors can a correct judgement be formed. Because of this method of dealing with the subject, the book will be of great value to those who wish to know the real causes of many of the abnormalities found in adults as well as in children.

Although dealing only with conditions found in England, the author has dealt with the subject in such a way that his method could be adapted for use anywhere with only slight variations. His insistence on the doctor's knowing at first hand the social conditions in which the child lives is a feature of this book and shows a deep insight into the complexity of the problems bound to arise in the minds of those who wish to treat the patient as well as his illness.

Written in clear, simple language and well printed on good paper, the book is a credit to all those responsible for its production. It is bound to exert a great influence on the future of school medical work.

PROBLEMS OF LIFE.

PROFESSOR LUDWIG VON BERTALANFFY, formerly of the University of Vienna, now of the University of Ottawa, Canada, is one of the foremost theoretical biologists of the day. The accumulated thought of some twenty-five years is presented in his book "Problems of Life".[2] Dr. Bertalanffy is a very learned man, having traversed the fields of genetics and biochemistry as well as the normal territories of zoology and botany including physiology. His factual accuracy is outstanding. He is a champion of the holistic school. "The fact that the processes in an organism are regulated according to the needs of the whole is the most striking characteristic of the phenomena of life." Holism, it should be mentioned, is by no means a recent conception. For example, a German work on biology written some fifty years ago dealt with this very topic. In it the following useful simile was given. If a bell is broken into fragments the separate pieces can be investigated physically and chemically, but the information thus obtained would not indicate what the bell's function really was—the pitch and timbre of the note, whether there was a strike note followed by a hum note,

[1] "The Medical Inspection of School Children", by Edgar Henry Wilkins, M.B., B.Ch. (Dublin), D.P.H. (London); 1952. London: Baillière, Tindall and Cox. 8½" × 6", pp. 232, with 18 illustrations. Price: 16s.

[2] "Problems of Life: An Evaluation of Modern Biological Thought", by Ludwig von Bertalanffy; 1952. London: Watts and Company. 9" × 6", pp. 226. Price: 25s.

or whether a fundamental would be present or merely assumed. A second feature of the exposition is an insistence on the dynamic quality of living matter. The employment of radioactive isotopes has shown us that the drift of material through living structures is much greater than was formerly assumed. Yet this feature of living things was recognized long ago. T. H. Huxley likened a living thing to a well-known wave in the rapids of the Niagara River, a wave that rises, falls, shrinks, swells, advances and retreats, but always possesses a definite individuality, though never composed one moment of the same water as the moment before.

The besetting sin of German philosophical and critical writers is a pronounced dogmatism linked with cocksureness, and Dr. Bertalanffy is not free from this characteristic. He is a lover of Goethe and tells us: "Goethe, not only a poet but a great naturalist, was the founder of morphology." Goethe was nothing of the sort. We read also that a certain Cusa overthrew the geocentric system, was a harbinger of modern astronomy and initiated the evolution which led in mathematics to the calculus, which is, of course, ascribed to Leibnitz and not to Newton. Histories of science are curiously reticent about the achievements of this Cusa. Bertalanffy cannot be accused of understatement about his own contributions to thought. The second law of thermodynamics applies only to closed systems, he asserts; also, modern physics owes much to biology, that is, to his biology, in going beyond closed systems into open systems. One would like to hear the comments of the physicist on this claim. The experimental biologist, including the medical researcher, will not assail such theoretical treatment as useless, but he will hesitate to admit that it can add to biological knowledge or will advance medical science.

CLINICAL HÆMATOLOGY.

"CLINICAL HEMATOLOGY", by Maxwell M. Wintrobe,[1] has appeared in a third edition thoroughly revised and enlarged by some 180 pages. It is one of the best books on the subject and is most reliable and complete. It is, too, a concise, clear, pleasant book to read or consult. The scientific accuracy of Wintrobe's work is unquestioned; he is, however, first and foremost a physician, and his book is written from a broader and more human standpoint than most books of "laboratory medicine". This standpoint is evident, for instance, in the following extract from the section on bone marrow, much of which is new in this edition: "It is natural that a procedure such as marrow aspiration, once established as a useful diagnostic aid, should come to be expected to solve all scientific problems. It must be emphasized, therefore, that while this method of study is at all times interesting and affords a more complete picture of the reaction of the hæmopoietic tissues than can be gained from examination of the blood alone, it can be expected to yield information of crucial importance only in a limited number of conditions."

In his preface to this edition the author states that an attempt has been made to scrutinize every detail of the whole volume; "the sections on bone marrow, the requirements for normal red cell production, the fate of the red corpuscle, coagulation, the effects of ionizing radiation, hæmolytic anæmias and hæmolytic disease of the newborn have been either extensively revised or completely rewritten and new sections have been added which deal with cytochemistry, splenic puncture and the role of heredity in hæmopoietic disorders. The application of the newer therapeutic agents, such as vitamin B_{12}, the various chemotherapeutic agents and the adrenocorticotrophic and adrenocortical hormones is considered and the advances which have been made in understanding the pathogenesis of many of the diseases of the blood are discussed". The bibliographies, notably excellent in previous editions, have, of course, been brought up to date. Twenty-three new illustrations have been added, and some older ones have been replaced. Three new plates in colour show cells from the bone marrow of special diagnostic significance—megaloblasts from the sternal bone marrow in pernicious anæmia in relapse, and megacaryocytes in thrombocytopenic purpura; these should be most useful in the study of the bone marrow. There is much that is new in the excellent chapters on hæmolytic anæmia and on anæmia in infancy and childhood. The subsection on thalassæmia is particularly well written. This book is a classic and should be in the hands of every student of medicine.

[1] "Clinical Hematology", by Maxwell M. Wintrobe, M.D., Ph.D.; Third Edition; 1951. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9½" × 6½", pp. 1048, with 220 illustrations and 17 plates, 13 in colour. Price: £6 14s. 6d.

PATTERNS OF ORGANIZATION IN THE CENTRAL NERVOUS SYSTEM.

"PATTERNS OF ORGANIZATION IN THE CENTRAL NERVOUS SYSTEM" contains the papers delivered at the thirtieth meeting of the Association for Research in Nervous and Mental Disorders.[1] In one of the most interesting of the 25 papers P. Weiss produces evidence from the transplantation of limbs in the salamander that orderly communication between centre and periphery is established even after abolition of the normal order of anatomical connexions and their functional appropriateness of peripheral effects. The transplanted limbs were found to move in accordance with their original connexions with the centrum. The rest of Section I of the meeting was devoted to the subject of reflex patterns. In Section II there were papers dealing with motor activity, and one group of workers reported their observations on the precentral or supplementary motor area. In Section III it was shown that research had widened greatly the concept of the cerebellum as a proprioceptive and vestibular organ merely. It seems possible, indeed, that every afferent system, smell not excluded, has some resonance in the cerebellum, which must now be regarded as largely concerned with preparation for changes during the actual course of movements. Section IV dealt with the distribution of information in the nervous system, the anatomy and physiology of the reticulo-thalamo-cortical system and the correlation of neuroanatomical and physiological with psychological data. When spatial discrimination occupies a considerable part in information conveyed by any sensory modality, thalamic and cortical distributions are topographical. Wilder Penfield discussed automatisms observed in epilepsy or induced in the course of operations on the brain, and suggested that Hughlings Jackson's "highest level" should give place to "centrencephalic", located in the brain-stem and parts of the thalamus. K. S. Lashley's paper on the functional interpretation of anatomic patterns closed the proceedings on a highly critical note. This book will repay close study by those concerned with neuroanatomy, physiology and clinical neurology.

[1] "Patterns of Organization in the Central Nervous System: Proceedings of the Association for Research in Nervous and Mental Diseases, December 15 and 16, 1950, New York", edited by Philip Bard, Ph.D.; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9½" × 6½", pp. 594, with 268 illustrations. Price: £6 9s.

AFTER-TREATMENT.

IT is a pleasure to review the fourth edition of H. J. B. Atkins's "After-Treatment", which has been extensively rewritten and brought up to date.[2] One of the best parts of this excellent book is the preface, which might well be read by all aspiring authors. There is little to criticize strongly. However, one cannot agree with the author's hurry to get the bowels open after abdominal operations. Kinsella's regime of "alimentary rest" after operation has given much greater satisfaction, both to the surgeon and to the patient, and it is to be hoped that in the next edition the author will be prepared to wait longer than the third post-operative day before he worries about the bowels. A little saline enema is then of much greater benefit than cascara or salts. Purgative addicts may sooner or later need an aperient and should be given the one to which they are accustomed. On the same subject, surely there is no need for Appendix I. A saline enema is all that is ever required for adults, whilst a glycerin suppository enema may be necessary for infants. A soap enema is far too dangerous even to be considered. One has only to see one case of gangrenous soap enema peritonitis and it will be eschewed for all time. It should also be remembered that this enema can cause a severe scarlatiniform rash. Other things that one never thought to read in 1952 are that calomel is still used and that castor oil even now has its enthusiastic advocates. Many will certainly disagree with

[2] "After-Treatment: A Guide to General-Practitioners, House-Officers, Ward-Sisters and Dressers in the Care of Patients after Operation", by H. J. B. Atkins, D.M., M.Ch. (Oxon.), F.R.C.S. (England); Fourth Edition; 1952. 9" × 6", pp. 356, with 64 illustrations. Price: 30s.

the treatment of abdominal distension by means of pituitrin and a turpentine enema, on the grounds that this method will quickly increase the incidence of paralytic ileus, which is, after all, only a further stage of bowel paralysis than abdominal distension.

It is a noteworthy fact that, as here, skin sutures are always removed earlier in books than in actual practice. The author still advises the local use of penicillin solution through tubes and the local insufflation of penicillin-sulphanilamide powder; both these methods of administering penicillin were best abolished, the first because of the risk of infection with penicillin-resistant organisms, which are far more dangerous than we were previously led to believe, the second because of the risk of sulphonamide allergy both local and general.

The after-treatment of operations varies in its minutiæ from country to country, even from hospital to hospital, yet its principles remain the same the world over. Consequently, with the reservations already stated, this book is an excellent vade-mecum for the Australian house officer and student in the care of patients after operation.

PRACTICAL BIOCHEMISTRY.

THE improvements in laboratory methods in clinical medicine provide a constant stimulus to changes in medical courses in practical biochemistry. A widely used text-book has recently appeared in a sixth edition.[1] This new edition of "Cameron and White" has been largely rewritten. The important changes include recasting of the sections on acid-base balance and pH in the light of increased interest in electrolyte physiology. The chapter on colorimetry now includes a good concise treatment of photoelectric colorimetry, an acknowledgement of the widespread use of this procedure in hospital laboratories. The following sections have been revised: those on blood, excreta, determination of blood sugar content (this revision includes a reliable micro method, and the estimation of both true and enhanced values), the determinations of blood contents of cholesterol, phosphate and the phosphatases, and the functional tests.

The general format of the book is as in previous editions. The paper, printing and binding are of high standard. The book can be recommended highly for its purpose—namely, as a course book for medical students. Its compact size and attention to difficulties and common sources of error in ordinary manipulations make it admirable for such students.

BLOOD PRESSURES.

"NORMAL BLOOD PRESSURE AND HYPERTENSION: NEW DEFINITIONS" is a small monograph by Master, Garfield and Walters[2] in which the history of blood pressure estimations is reviewed and the commonly accepted criteria of normality are criticized. The authors, on statistical evidence, claim that blood pressure increases with age and varies with sex and that no arbitrary figure should be accepted as a dividing line between normal and abnormal tension. They publish tables indicating the normal range for different age groups. In males the normal systolic figures are 100 to 135 millimetres of mercury at the age of sixteen years, increasing to 115 to 170 millimetres at the age of sixty to sixty-four years. The diastolic estimations at the same age levels range respectively from 60 to 86 millimetres of mercury and from 70 to 100 millimetres.

The authors also give figures which they recommend should be accepted as the lowest levels of hypertension in different age groups. Experienced clinicians would agree with their view that clinical hypertension should not be diagnosed if the only evidence is that the reading is over 150 millimetres, systolic, and 95 millimetres, diastolic, and age, progression of rise in pressure and evidence of vascular disease are not taken into account. They do not accept the figures of normality given by insurance companies because of the relatively restricted groups on which these standards are based. They confirm the view that weight but not height is a factor in producing high blood pressure and that coronary disease in the female but not in the male is closely related to hypertension. If their figures of normality are accepted, the authors confirm the view that cardiac enlargement in males is frequently due to coronary sclerosis in the absence of hypertension. This book should be read by all interested in the treatment of the hypertensive patient.

AVIATION MEDICINE.

WHEN in 1939 Surgeon-General Harry G. Armstrong brought out his "Principles and Practice of Aviation Medicine" it was at once realized that an authoritative work on this important and growing topic had been given to the profession. A reprint appeared in 1940, another in 1941 and two in 1942. A second edition published in 1943 was favourably reviewed in these columns. Now in 1952 a third edition[1] is certain of a hearty welcome, for it is a notable improvement on its predecessors; four new chapters have been added, the others have been extensively revised or actually rewritten, and new tables and figures have been introduced. One very prominent feature in this new edition is that the exposition is no longer predominantly military; civil aviation is increasing rapidly, demanding some knowledge of the problems of flight from most members of the medical profession. Again and again have highly specialized and recondite treatises been recommended as useful to the general practitioner, whose powers of assimilation, great as they certainly are, would need considerable enlargement were such works to be of service. This book does not suffer from such an irritating characteristic; it is emphatically a book which the general practitioner should read and is certain to enjoy, for the exposition is admirable in its clarity and does not make extravagant demands on the reader's knowledge of physics. The presentation is in fact what we expect in a first-class medical text-book. In our review of the second edition it was suggested that the examination of the eye should be conducted by ophthalmic specialists. Admittedly visual sensations are of supreme importance in the activities of the pilot, but that makes it all the more imperative, we repeat, that the examinations for errors in refraction, accommodation, stereoscopic adjustment, colour perception and the like should be left to experts, even if the doctor who specializes in aviation medicine gives considerable attention to eye work. Apart from this opinion, which can no doubt be challenged, the treatment is eminently practical. It is obvious that the writer not only has read the literature of the subject, but knows by frequent flight experiences how to distribute the emphasis amongst the topics discussed. This excellent text-book might in the next edition be given a fuller index.

Notes on Books, Current Journals and New Appliances.

A NEW FRENCH-ENGLISH AND ENGLISH-FRENCH MEDICAL AND BIOLOGICAL DICTIONARY.

AN unusual type of French-English and English-French medical dictionary has been prepared by Pierre Lépine, of the Pasteur Institute, with the aid of Gilberte D. Krassnoff.[3] In his foreword the author explains how he came to under-

[1] "A Course in Practical Biochemistry: For Students of Medicine (Cameron and White)", revised by Frank D. White, A.R.T.C., Ph.D. (Edinburgh), F.R.I.C., and George E. Delory, M.Sc., Ph.D. (London); Sixth Edition; 1952. London: J. and A. Churchill, Limited. 8½" × 5½", pp. 234, with 23 text figures. Price: 17s. 6d.

[2] "Normal Blood Pressure and Hypertension: New Definitions", by Arthur M. Master, M.D., Charles I. Garfield, M.D., and Max B. Walters, M.D., F.R.C.P. (Can.); 1952. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9¼" × 6", pp. 144, with 36 illustrations. Price: £2 3s.

[1] "Group Treatment in Psychotherapy: A Report of Experience", by Robert G. Hinckley, M.D., and Lydia Hermann, M.S.; 1951. Minneapolis: University of Minnesota Press. London: Geoffrey Cumberlege, Oxford University Press. 9½" × 6½", pp. 146. Price: 31s. 6d.

[2] "*Dictionnaire français-anglais, anglais-français des termes médicaux et biologiques*", by Pierre Lépine, with the collaboration of Gilberte D. Krassnoff; 1952. London: H. K. Lewis and Company, Limited. 8½" × 6½", pp. 830. Price: 63s.

take the work. He had had in mind for some years the compilation of such a dictionary to overcome some of the difficulties confronting translators, but the enterprise had to be put off for various reasons, and dwindled to the idea of compiling a glossary. Then in 1945 he had to undertake the task of distributing to the French translators the articles in the *British Medical Bulletin* which made up the French edition of that journal. In the author's own words, *"cette entreprise fut éphémère mais instructive"*. When he saw the translations—made, let it be said, by excellent professional translators—they were full of mistakes or inaccuracies. On the other hand, the occasional translators drawn from the ranks of the medical profession knew scarcely anything beyond the vocabulary of their own specialty. Once more the author realized the need for the type of dictionary that he had originally had in mind; and in 1947 at the request of *Éditions médicales Flammarion* he undertook to compile it.

From then the author was confronted chiefly with the difficulty of choosing the words to be included. He explains that he has tried to keep the dictionary from being unduly cumbersome, and that has meant the omission of many alternative expressions, for example, that some people may think should have been included. As a general rule he has given the word most commonly used, whilst in some instances retaining *"les plus justifiés des néologismes"* (we hope Sir Alan Herbert would approve) *"et des termes savantes"*, which are frequently accompanied by a definition or a short explanation. A section which will be widely appreciated is that containing "numerical data and tables for the conversion into international metric units of the English scales of temperatures, lengths, weights and volumes".

If the purpose for which this dictionary has been prepared is kept in mind, it will be found very useful; it is inevitably somewhat restricted. On the other hand, there is no doubt that those who have to undertake the making of medical and scientific translations will heartily thank the author for the excellent work he has done. He has disarmed all criticism by stating that the dictionary undoubtedly has many errors and omissions, and asking that they be pointed out to him.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Methods in Medical Research", Volume V, edited by A. C. Corcoran, Lyman C. Craig and Melvin Cohn; 1952. Chicago: The Year Book Publishers, Incorporated. 8½" × 6", pp. 408, with 26 illustrations. Price: $7.50.

Contains three sections dealing respectively with methods for separation of complex mixtures and higher molecular weight substances, methods of renal study and immunochemical methods for determining homogeneity of proteins and polysaccharides.

"Pictorial Handbook of Fracture Treatment", by Edward L. Compere, M.D., F.A.C.S., and Sam W. Banks, M.D., F.A.C.S., revised with the assistance of Clinton L. Compere, M.D., F.A.C.S.; Third Edition; 1952. Chicago: The Year Book Publishers, Incorporated. 8½" × 6", pp. 424, with 223 illustrations. Price: $6.50.

The first complete revision since August, 1947.

"Fitness for the Average Man", by Adolphe Abrahams, O.B.E., M.D., F.R.C.P.; 1952. London: Christopher Johnson. 7½" × 5½", pp. 174. Price: 10s. 6d.

A popular study by the honorary medical adviser to the British Olympic Athletic Team.

"Physical Diagnosis", by Harry Walker, M.D., F.A.C.P.; 1952. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 7", pp. 462, with 126 illustrations. Price: £4 4s.

An attempt to describe and interpret the signs which are generally considered to be valuable in physical examination.

"Rheumatic Diseases: Diagnosis and Treatment", by Eugene F. Traut, M.D., F.A.C.P.; 1952. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 7", pp. 958, with 192 illustrations. Price: £10 10s.

Intended for the medical student, the general practitioner and the specialist.

"Aids to Osteology", by Nils L. Eckhoff, M.S. (London), F.R.C.S.; Fifth Edition; 1952. London: Baillière, Tindall and Cox. 6½" × 4½", pp. 272, with 42 text figures. Price: 6s. 6d.

A revised edition of this member of the "Aids" series. The previous edition was in 1942.

"The Surgical Clinics of North America"; 1952. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Lahey Clinic Number. 9" × 6", pp. 292, with 105 illustrations. Price: £7 5s. per clinic year in cloth binding, and £6 per clinic year in paper binding.

Contains a symposium of 14 articles on orthopædic surgery and neurosurgery, as well as 17 articles on miscellaneous surgical subjects.

"The Surgical Clinics of North America"; 1952. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. New York Number. 9" × 6", pp. 358, with 52 illustrations. Price: £7 5s. per clinic year in cloth binding, and £6 per clinic year in paper binding.

Contains a symposium of 21 articles on basic sciences in surgical practice.

"The Surgical Clinics of North America"; 1952. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Mayo Clinic Number. 9" × 6", pp. 300, with 90 illustrations. Price: £7 5s. per clinic year in cloth binding, and £6 per clinic year in paper binding.

Contains a symposium of 15 articles on some aspects of the surgery of the endocrine glands and 12 articles on other surgical subjects.

"Synopsis of Pathology", by W. A. D. Anderson, M.A., M.D., F.A.C.P.; Third Edition; 1952. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8" × 5", pp. 788, with 334 text illustrations and 13 colour plates. Price: 84s.

Intended to fill a gap between elementary manuals and large text-books.

"I Congresso Ibero-Latino-Americano de Dermatologia e Sifilografia e VII Reunião Anual dos Dérmato-Sifilógrafos Brasileiros"; 1950. Rio de Janeiro. Sociedade Brasileira de Dermatologia e Sifilografia. 9½" × 6½", pp. 458, with 80 illustrations.

Proceedings of the first Spanish Latin American Congress of Dermatology and Siphilology.

"Nerve Impulse: Transactions of the Third Conference, March 3 and 4, 1952, New York", edited by H. Houston Merritt, M.D.; 1952. New York: Josiah Macy Junior Foundation. 9½" × 6½", pp. 176, with 16 illustrations. Price: $3.50.

Contains papers with discussions on three subjects: biochemical similarities and differences between synaptic transmission and axonal conduction; electrical similarities and differences between synaptic transmission and axonal conduction; the structure of synaptic junctions.

"Research in Endocrinology", by August A. Werner, M.D.; 1952. St. Louis: August A. Werner. 8½" × 6", pp. 288, with 13 illustrations.

A record of the activities in scientific medicine and as a physician of Dr. August A. Werner.

"A Handbook of Operative Surgery: Surgery of the Chest", by Julian Johnson, M.D., D.Sc. (Med.), and Charles K. Kirby, M.D.; 1952. Chicago: The Year Book Publishers, Incorporated. 8½" × 6", pp. 388, with 81 illustrations. Price: $9.00.

Prepared primarily as an atlas of thoracic surgical operations, following generally standard procedures.

"First International Symposium on Chemical Microbiology: Microbial Growth and its Inhibition", 1952. Geneva: World Health Organization. Monograph Series, No. 10. 9½" × 6½", pp. 290, with 57 illustrations. Price: 15s.

Contains 18 papers (14 in English, four in French) presented as a symposium by authorities on microbial physiology and antibiotic chemistry.

The Medical Journal of Australia

SATURDAY, DECEMBER 20, 1952.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ON KEEPING YOUNG.

THE interest that has been manifested during recent years in the aged, their care and the diseases from which they suffer, is reflected in the number of books and articles that have appeared dealing with the subject and the number of discussions that have taken place before learned societies. During the last decade the subject has been dealt with on many occasions in these columns; the last was on September 20, 1952, when, under the title "On Growing Old", reference was made to work by Isaac Starr and E. A. Hildreth on ballistocardiography and by J. Fazekas and others on the cerebral physiology of the aged. Attention has now to be directed to the third edition of "Cowdry's Problems of Ageing: Biological and Medical Aspects", of which Albert I. Lansing is the editor.[1] Lansing states in his preface that this edition is essentially a progress report, his primary object being to set out what has transpired in gerontology since 1942. He has not tried to influence the writings of the forty-six contributors; an attempt has been made to convey to the reader, for better or worse, an objective synopsis of new developments and ideas on the subject. This book will appeal to a certain type of mind, for many will prefer to find statements on conditions in which they are particularly interested and to trace for themselves any application that they may have in relation to other aspects. We find three divisions in this book. The first deals with biological and cellular problems of aging,[2] the second deals with clinical and organic problems, and the third with social and economic problems. Lansing raises a most important question in his introduction—he asks for clarification of the relation between degenerative diseases and aging. He asks what exactly do we mean by the terms. He points out that neither is well enough defined to permit a rational distinction to be made between the two. Aging to his mind is a problem of adulthood, of generally progressive deleterious change in adulthood, correlated with the passage of time. Some of the changes may be classed as diseases and may be curable or reversible. Others may involve profound alterations in the physico-chemical make-up of protoplasm and as such may be irreversible. He concludes that, regardless of reversibility or specific ætiology, all such changes constitute aging. This seems to be a reasonable conclusion.

But let us look at one or two of the "problems" in the individual chapters. One chapter, as would be expected, deals with diet—"Chemical Aspects of Ageing and the Effect of Diet upon Ageing" (by C. M. McCay). The experiments recorded under the heading of "Growth Rate and Life Span" are full of interest, and results were not what might have been expected. For example, one group of rats whose growth was retarded tended to outlive those that matured normally. Other experiments following on from these are recorded. A possible conclusion from work such as this is stated: "Eat what you should, after that eat what you will but not too much." We are told that the last century has created new hazards in nutrition for people of all ages, especially for older folk. The first of these is the danger of inadequate intakes of vitamins, minerals and protein owing to decreased exercise and lowered calorie intakes. The second hazard in later life is the temptation to consume foods that provide little beside energy. Clearly in the matter of food care has to be taken not for a day but for long years, and then the economic factor has to be considered. Most people nowadays have some idea of the kind of food that should be eaten, but many, particularly those advanced in years, have not the money to pay for it. The digestive system is discussed by A. C. Ivy and M. I. Grossman. They show that deaths from disturbances of the digestive organs are usually due to diseases which do not represent a wearing out or aging *per se*. In other words most elderly people die with a digestive system which, when not locally altered by cancer or by a toxic process, is capable of functioning beyond the ordinary life span. Even so it is striking that during life symptoms referable to the gastro-intestinal tract occur more frequently than those referable to any other system in the body. This, it is stated, is because the alimentary tract is readily influenced reflexly by mental states and by disease elsewhere in the body, and because many of the symptoms of disturbance of the tract are functional and tend to respond readily to diet and rest. This is stated to have probably been the reason why Josh Billings wrote: "I have finally kum tu the konklusion that a good reliable sett of bowels is worth more tu a man than enny quantity of brains." After this a natural reference will be to what is written about the nervous system. In the opening paragraph of his chapter James L. O'Leary writes that the scientists who were responsible for his early training all remain keen of wit and intellectually productive and have continued to grow in wisdom through the years, though each suffers from one or another infirmity of age. Thus he concludes that aging is not entirely determined chronologically—"the changes are not uniform in all systems, nor does ageing progress to the same degree in the different structures of one system".

[1] "Cowdry's Problems of Ageing: Biological and Medical Aspects", edited by Albert I. Lansing, Ph.D.; Third Edition; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9½" × 6½", pp. 1084, with illustrations. Price: £8 1s. 3d.

[2] Throughout the book the spelling "ageing" has been adopted; this journal has always followed the spelling of the Concise Oxford Dictionary—"aging".

But we shall return to O'Leary's teachers later. O'Leary discusses histological changes in the human brain; he states that histologically demonstrable damage must represent the end result of aging in the nervous system, since usual histological methods are too insensitive to reveal fine changes. For research on aging of nervous tissue to proceed apace with that of other organs "it is imperative that data be acquired by animal experimentation demonstrating effects upon electrical activity and upon the chemical substrate". Dealing with psychiatric aspects, O'Leary refers to work by S. Granick on the psychology of senility. Granick found that in subjects over forty years of age there was a progressive decline in overall test performance as related to increasing age. However, where speed of response was not a factor older adults did as well as younger ones. Granick found that memory functioning, efficiency of performance and tasks involving the relinquishing of old habits were difficult for old people. At the same time he admitted that healthy old adults are capable of making significant contributions to "cultural, industrial and social institutions". History, of course, is full of examples of this. O'Leary has a wordy way of expressing his ideas. He writes: "With increasing age the individual survives his intimates. Thus interpersonal contacts become progressively impoverished, and free social relationships are not established readily with younger replacements."

In an attempt to stage a logical discussion on some of the "Problems of Ageing", we must omit reference to many chapters of interest and importance and pass on to the third section which deals with social and economic problems. Most people will agree that the chief problem of aging is the prevention of aging, in other words how to grow old and still to keep young. It is in the third section of the book that we look for most help in this. Here there are four chapters: "Trends in the Ageing Population", by P. M. Hauser and E. Shanas; "The Older Worker in Industry", by R. K. Burns and L. B. Brown; "Roles and Status of Older People", by R. J. Havinghurst; "Personal Adjustment in Old Age", by Ruth S. Cavan. Among the subjects discussed is enforced retirement at a stated age. If the reader does not already realize it, he will consent to Burns and Brown's contention that something will have to be done before long to allow men to work after the retiring age when they are able to do so. A great deal of common sense has been put into the chapter on personal adjustment. But we must ask ourselves whether the need for adjustment cannot be avoided. What is needed is that a man shall grow old with a full knowledge of what old age is going to mean and with some idea of what its limitations will be. He will be able to do this if he has a widely ranging mind and if he keeps it as far as possible unprejudiced and open to receive new impressions and to tolerate new points of view. Nothing is more pitiable than to find a man who has reached what is known as the allotted span of three score years and ten and whose mind is so closed, so set in a deep groove, that he will not consider any doctrine or *modus operandi* different from that approved by him, and who takes as a personal affront any suggestion that he should even discuss it. Unfortunately there are such people. In the world of religion we read sometimes of saintly men who have lived their lives "*sub specie æternitatis*", who realize that man is not the creature of a moment, here for today and gone for ever tomorrrow; they have planned and lived their lives in the belief that death does not end everything and that they will have a life in the hereafter. There seems to be no reason why man should not live his life more or less *in specie senectutis*, determined to keep his mind active, interested and open. Most of us have known men who have done this (O'Leary's teachers were of this kind); they are those who collect around them friends of a younger generation than their own, and in their last years they do not find themselves so lonely and pathetic as they otherwise might be. Their minds are like a well-kept garden—weeded, carefully planted and watered. People like this do not need a great deal of adjustment when they reach old age. The last chapter in this book should be read with thoughts of this kind in mind. As a matter of fact the whole book is worthy of careful attention.

Current Comment.

COMPENSATORY MECHANISMS FOR THE ANOXIA OF CONGENITAL HEART DISEASE WITH CYANOSIS.

As Robert Platt[1] observed in his Lumleian lectures, teleological argument fulfils a useful role if it leads to the formulation of an hypothesis which may subsequently be put to the test. It might also be said that from the point of view of practice and as an aid to memory in some instances it has some value if it leads merely to a working hypothesis, although this statement is less acceptable scientifically. However, it is reasonable to regard many of the changes which accompany cyanotic congenital heart disease as adaptative in nature, and these have recently been reviewed by H. E. Holling,[2] his study being based on work previously published in conjunction with G. A. Zak and on the reports of other workers. Fundamentally, oxygen lack in these conditions is caused by limitation of the volume of mixed venous blood which can be oxygenated in the lungs. He emphasizes the fact that tissue oxygen supply is dependent not only upon the arterial oxygen tension, but also on the volume of blood reaching the tissues, by reference to cases of pure pulmonary stenosis: here the arterial saturation is normal, but the blood flow to the tissues is reduced in proportion to the severity of the stenosis. Where there is a veno-arterial or arterio-venous shunt, the blood passing through it may be regarded as uselessly circulating through the systemic or pulmonary circulations respectively, from the point of view of oxygen transportation. In other words, the degree of anoxia is related basically to what Bing has termed the effective pulmonary blood flow, which, in litres per minute, equals the oxygen consumption (millilitres per minute) divided by the difference in oxygen content of pulmonary venous and mixed venous blood (millilitres per litre). In the example of pure pulmonary stenosis mentioned above it is clear that the effective pulmonary blood flow may be augmented by increasing the right ventricular pressure, and this in fact illustrates the first important compensatory mechanism—increase in cardiac work. The second mechanism, increase in oxygen utilization, is indicated by the low mean oxygen tension of the mixed venous blood, which is about 30 millimetres of mercury (60% saturated), the normal level being about 41 millimetres. The difficulty is admitted of obtaining a true sample of mixed venous blood, particularly in the presence of a left to right shunt in the heart. This figure shows some variation in conformity with the arterial oxygen level, but this is not

[1] *British Medical Journal*, June 21, 1952.
[2] *Clinical Science*, Volume II, Number 3, 1952.

great; the constancy of mixed venous oxygen tension is sufficient to suggest that tissue uptake below this level is minimal. Indirect evidence indicates that the increased oxygen utilization may be effected by the opening of new capillaries, as occurs normally during exercise. Polycythæmia has long been recognized as a probable compensatory phenomenon. Holling shows that the hæmoglobin concentration correlates better with the effective pulmonary blood flow than with the arterial oxygen saturation, thus emphasizing for a particular tissue, the bone marrow, the importance of the volume of blood delivered as well as the absolute level of its oxygen content. The correlation might well have been higher had not many of the subjects studied had a lowered mean corpuscular hæmoglobin concentration, suggesting a relative deficiency of iron or other constituent of hæmoglobin. It is interesting, although not strictly relevant, to note that Platt has suggested that diminution of the red cell count may serve as an adaptative mechanism to maintain the normal renal plasma flow in cases of renal failure.

Holling dismisses other possible compensatory mechanisms as of minor importance. A decrease in basal oxygen requirements has not been proved in these cases, nor has any significant change in the combining power or dissociation curve of hæmoglobin been demonstrated. An increased respiratory minute volume cannot greatly increase the oxygen saturation of the blood circulating through the lungs, nor can efficient compensation be achieved by an increase in cardiac output, limited by the nature of the malformation, in the presence of a veno-arterial shunt. Holling therefore summarizes the main compensatory mechanisms as, firstly, an increase in right ventricular pressure in an effort to increase the effective pulmonary blood flow, then an increase in the utilization of oxygen by the tissues, and finally, as the effective pulmonary blood flow falls below two litres per square metre per minute, an increase in the oxygen-carrying capacity of the blood. His discussion relates to an aspect of congenital heart disease which receives little consideration in most text-books.

STUDIES IN VASCULAR DISEASE IN DIABETES.

DIABETICS owe a great deal to those who have never grown weary of helping them to conquer a lifelong disease, and in particular to those who have produced insulins of various types, which control their disordered metabolism, and antibiotics, which lessen so greatly the risks of infections. The great remaining problem is that of vascular disease, and the medical scientist is far from satisfied with his knowledge of it. One recent study has attacked the question from the point of view of the vascular damage discovered *post mortem*, its frequency, its relation to various factors, such as the duration of diabetes in the individual, and its importance as a cause of death. E. T. Bell has published a study of 1559 autopsies performed on diabetic subjects at the University of Minnesota over the last forty years.[1] Of these 70% had been performed since 1939, and less than 5% during the pre-insulin era. The author considers that the treatment the subjects had received was of a good average standard. Analysis of the records, three-quarters of which are supported by histological evidence, has been made so as to obtain information concerning the age at onset, as judged by the first discovery of sugar in the urine, the length of life, the incidence of vascular disease with respect to the age at death, the occurrence of specific vascular accidents, such as coronary occlusion, cerebral infarction, intracranial hæmorrhage, hypertensive cardiac failure, renal arteriosclerosis and gangrene of the lower extremities. As a general control parallel observations have been made on the frequency and distribution of severe vascular disease in non-diabetics. In the first decade no sign of notable vascular disease was found at autopsy, but four patients who survived for more than twenty years died of vascular lesions. The second decade revealed similar findings, and of 20 subjects who survived for from ten to twenty years, 10 died from renal sclerosis, one from coronary disease, and one from myocardial failure. Ten of this group lived for twenty to twenty-five years, and half of these succumbed to vascular lesions. Thus it appears that young diabetics surviving for twenty years are apt to die from vascular disease; the most common form was found to be renal arteriosclerosis. Numbers of writers have pointed out that twenty years of diabetes will probably end with vascular disease in young persons. The third decade only produced two out of 38 persons who showed signs *post mortem* of severe circulatory disease. Of those who started their diabetic career during the fourth decade only five died in the first ten years, but seven of those surviving the longer periods died of renal sclerosis. After the age of forty years this study showed that the frequency of vascular disease is still affected by the duration of the disease, but the effect is less than in the younger age groups. Since about 30% in the older age groups were found to die of vascular disease, it seems reasonable to attribute only the excess over this 30% to diabetes. With regard to the influence of the severity of the diabetes upon the development of vascular disease, it is noted that most of the diabetics under the age of forty years are regarded as having a moderately severe, or a severe form of the malady, whereas a large proportion of older diabetics have a mild type of the disease, which is often satisfactorily controlled by diet without insulin. Bell draws certain other conclusions from the statistical evidence he has assembled. The types of vascular disease liable to be accelerated by diabetes are gangrene, renal arteriosclerosis and coronary disease, but diabetes of long duration does not necessarily terminate by a condition involving the blood vessels. Further, he thinks that the long span of life achieved by some in his series is not of necessity attributable to better control of the diabetes.

An interesting pendant to this study is found in two articles, by M. L. Handelsman, Leon M. Levitt and H. Conrad, and by M. R. Cholst, L. M. Levitt and M. B. Handelsman respectively.[1] These are based upon observations in living subjects, and record the findings when the drug "Priscoline" was given to persons with diabetes, in order to discover and compare the vasodilator effects of the drug, both on the skin vessels of the toes and on the retinal vessels. Patients were chosen who had suffered from diabetes for ten to fifteen years, but who had apparently healthy vascular systems, and who had no symptoms referable to their extremities. Skin temperatures of the toes were measured, and lack of a rise in the temperature was interpreted as an inability of the skin vessels of the toes to dilate according to the usual pharmacological response found after the intravenous administration of "Priscoline". In a large number of diabetics this dysfunction of the small vessels was found, even in the absence of any abnormality of the peripheral circulation. Similar studies of the retinal vessels were made by an indirect method, that of angioscotometry. This depends upon the tracing of bands of physiological blindness corresponding to the retinal blood vessels. Of 28 patients studied, 12 gave only poor response to an injection of "Priscoline". Since these findings were in patients who showed no signs of retinal arteriosclerosis, it was concluded that there existed a dysfunction in the retinal vessels. In most of the patients whose response was poor exudation was also found in the perimacular region. No correlation could be demonstrated between the dysfunction in the vessels of the toes and those of the retina. These observations are interesting, inasmuch as they seem to show that early disturbances of function of peripheral vessels may occur and may not be accompanied by demonstrable changes for a considerable time. There are always possible logical fallacies in trying to relate experimental findings in the living with changes after death, which are in many instances end states, but further clinical studies would be welcomed.

[1] *Archives of Pathology*, May, 1952.

[1] *The American Journal of the Medical Sciences*, July, 1952.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Experimental Studies on Passive Immunization Against Poliomyelitis.

DAVID BODIAN (*The American Journal of Hygiene*, July, 1951) began experimental studies on passive immunization against poliomyelitis by testing protection with human γ-globulin against intramuscular inoculation, and also protection by combined passive and active immunization. He used rhesus monkeys, three strains of Lansing type virus, including the original strain, two Brunhilde strains and a Leon strain from paralysed patients. The γ-globulin was known to have a neutralization end point of $10^{-2.5}$. The serum of monkeys used was tested for antibody content by mouse neutralization tests. Antibody levels after intramuscular injections of a single dose of either two or ten millilitres per kilogram showed that the smaller dose disappeared in twenty-one days, the larger in forty days after injection. In protection experiments, when serum was given in one thigh and challenge virus in the opposite thigh at the same time, protection was obtained against paralysis with representatives of each type of virus. However, the virus known to produce fatal infection in monkeys still produced severe paralysis. The duration of protection was short, and if serum was given more than three days after virus inoculation, it had no effect. Tests were made to find whether the presence of passive antibody influenced the response to small doses of active virus. Animals were challenged with a large dose of Lansing virus given intracerebrally, and none were paralysed; seven weeks later they had a high titre in their serum, which could not have been due to the γ-globulin. Neutralized mixtures of active virus and γ-globulin were almost completely inactive when used as an immunizing agent.

Experimental Brucellosis.

ABRAHAM J. BRAUDE (*The Journal of Infectious Diseases*, July-August, 1951) has continued his studies in the pathology and pathogenesis of experimental brucellosis by inquiring into the formation of the hepatic granuloma and its evolution. He states that it had previously been shown that animals in which abscess formation took place showed poor resistance to *Brucella suis* or *Br. melitensis*, while in *Br. abortus* infections a non-suppurative lesion was associated with good defence against infection. As lesions were most frequently present in the liver this organ was studied, and at the same time observations were made on the possible relationship between the presence of the granuloma and hypersensitivity. The size of the inoculum did not alter the character of the lesions, but merely altered their number; the administration of aureomycin protected infected mice, but did not alter the character of the tissue change. Photographs of tissue sections of livers from animals sacrificed at varying times showed phagocytosis of brucella by polymorphonuclear leucocytes in the blood three hours after inoculation. Six hours later these had begun to accumulate in the liver. After twenty-four hours Kupffer cells were distended by organisms, and in one hundred and twenty hours the epithelioid cells had developed and presented the appearance of the granuloma. After three months, the granuloma was still recognizable and had a hyaline centre, and after six months the cellular peripheral zone had decreased in size. After one year, no histological changes could be seen in the liver. These animals had all been vaccinated with doses of heat-killed cells during the progress of the experiments, and at no time was a reaction obtained to the intradermal inoculation of antigen or of whole organisms; this indicates that hypersensitivity is not necessary for the development of the granuloma. The author made comparisons between the granuloma of brucellosis and the tubercle of experimental tuberculosis.

Complement-Fixation Test for Poliomyelitis Infection.

J. CASALS, P. K. OLITSKY AND R. O. ANSLOW (*The Journal of Experimental Medicine*, August, 1951) have developed a specific complement-fixation test for infection with poliomyelitis virus. They used the central nervous system tissue of intracerebrally infected suckling mice, removed two days after infection of the mice with an adapted "MEF" strain. The tissues were removed, frozen immediately and pooled until a workable amount was collected. The antigen was obtained by repeated acetone and acetone-ether extraction in the cold; it was dried by evaporation and then dissolved in physiological saline, treated with 1:10,000 "Merthiolate" solution and kept frozen. Hyperimmune sera from mice and cotton rats were treated, as well as sera from normal humans and poliomyelitis patients, and from poliomyelitis-infected chimpanzees. The antigens were of low titre, and tests showed enhancement of complement action by the antigen, so complement dosage was kept to less than two units of the dose required for sheep cells sensitized by three minimal hæmolytic doses of hæmolysin. Serum dilutions from 1:2 up to 1:64 were tested. The test appeared to be specific against "MEF"-immunized mouse serum. An occasional reaction could be obtained from serum of a patient in whom a Brunhilde strain of virus had been isolated. Some normal persons gave sera which had complement-fixing antibody present, and some of these also had Lansing neutralizing antibody. Among persons without Lansing antibody, only one of nineteen reacted with this "MEF" antigen. The full significance of these findings is not apparent without the result of further work now in progress.

The Effect of Penicillin on Typhoid Antibody Production.

S. GREEN, M. G. WOHL AND S. O. WAIFE (*The Journal of Infectious Diseases*, September-October, 1951) have studied the effect of penicillin on typhoid antibody production. This was prompted by two reasons—the finding of low antibody levels in patients being treated with penicillin, and recorded statements of the lowering of antibody response in infectious disease following penicillin administration. Two groups of patients not affected with infectious disease were studied, one receiving two doses of 0·2 millilitre of typhoid vaccine intracutaneously, the other three 0·5 millilitre of typhoid vaccine at weekly intervals. Varying dosages and preparations of penicillin were employed, while comparable control patients for each group received vaccine alone. Blood specimens were obtained before the injection of typhoid vaccine and at weekly intervals during the experimental period. Agglutination titres of the sera were measured and compared. There was no significant difference between the titres obtained in the test and control groups. Patients with no detectable antibody rose to titres of 1:40 to 1:360 in each group, patients with original titres of 1:80 rose to 1:320 in each group. The authors discuss the importance of natural mechanisms in recovery from infectious disease. They believe that penicillin *per se* does not affect the body's ability to produce agglutinins, and inhibitory effects recorded are probably on the basis of the early destruction of the pathogenic organism.

Red Cell Membranes after Infection with Foot and Mouth Disease Virus.

B. EPSTEIN, N. M. FONSECA AND E. DE ROBERTIS (*The Journal of Experimental Medicine*, September, 1951) have made an electron microscope study of red cell membranes after experimental infection with the virus of foot and mouth disease. They state that the blood of animals with the disease is known to be infective at a certain time. While the intact red cell is too thick for electron microscopy, after lysis by osmosis the cell framework is partially transparent to the electron beam. Study was made first of the normal red cell membrane, and then of cell membranes prepared at intervals after infection. It was found that small particles, about 20 per cell, ranging in size from 100 to 500 millimicrons, appeared twenty-four hours after inoculation of virus; in a further twenty-four hours these had taken up a ring distribution, and their average size was about 250 millimicrons. Their internal structure could not be definitely described. Ninety-two hours after inoculation, the red cell membranes showed no trace of these particles. Subinoculation of the blood from which these pictures were made demonstrated that while the bodies were present in the cell envelope, the disease could be transmitted, and when they had disappeared, the blood did not infect normal animals. Further than this, the authors make no claims for the significance of their observations.

Poliomyelitis Viruses in Tissue Cultures.

J. S. YOUNGNER, ELSIE N. WARD AND J. E. SALK (*The American Journal of Hygiene*, March, 1952) began studies on poliomyelitis viruses in cultures of monkey testicular tissue. They extended the work of Enders in improving solutions added to the portions of minced tissue embedded in plasma clot which constitutes the tissue growth. The tubes once prepared are enriched with fluid containing balanced salts, extract of chick embryo and horse serum, and placed in the incubator drum at 37° C. and rotated at twelve revolutions per hour. The fluid is replaced after four days, and after eight

days a well-defined fibroblastic outgrowth is visible. Virus emulsion prepared from infected spinal cords will affect the tissue culture and cause rounding of cells and disappearance of the fibrils of the fibroblasts. The known strains which may be grown in this way are referred to as types 1, 2 and 3, corresponding broadly with Brunhilde, Lansing and Leon. The fluid removed from the cultures can be inoculated into mice in high dilution; death of the animals demonstrates the virus activity in the fluid. In a second paper the authors record differences among strains in tissue culture infectivity, with preliminary data on the quantitative estimation of virus and antibody. They state that by serial dilution of the infecting inoculum it is possible to establish a time of appearance of the cell changes in the cultures produced by different strains of virus. Type 1 occurs in six days in 10^{-3} dilution, some members of type 2 take three to six days in 10^{-2} dilution, and type 3 also take three to six days. Some type 2 cultures do not appear to affect the tissue culture at all. Specific antiserum from convalescent patients or immunized animals will inhibit the virus effect. One strain of virus has been isolated in tissue culture from fæces, and then produced paralysis in monkeys inoculated from the culture fluid. The authors discuss some of the difficulties involved in the technique and questions still to be resolved. There are several illustrations.

HYGIENE.

Studies on Bacteria and Fungi in Cotton Dust in Relation to Byssinosis.

G. FURNESS AND H. B. MAITLAND (*British Journal of Industrial Medicine*, April, 1952) examined the flora of dust obtained from cotton imported into England to determine its relation to byssinosis. Microscopically Gram-positive cocci and bacilli, bacterial spores, fragments of mould hyphæ and mould spores were seen. Gram-negative bacteria were not easily detected, though they were revealed by culture. The Gram-positive cocci were probably dead, as only once were they found in the culture. Among the aerobic bacteria the genus *Bacillus* usually predominated; the remainder were Gram-negative bacilli, of which about 70% or more were *Bacterium* and the rest *Achromobacter* except for a few *Alkaligenes* in one sample. A few aerobic actinomyces were found in three samples and a few colonies of micrococci in one sample. Details of the cultural and biochemical characters of the aerobic bacteria are given. They appeared not to be pathogenic for guinea-pigs. Of the anaerobic bacteria, *Clostridium welchii* (type A) was isolated once by direct plating on blood agar and from each of three samples of dust by inoculating dust and calcium chloride into guinea-pigs. *Cl. histolyticum* was obtained from one sample. Several other clostridia were isolated which did not correspond with any recognized species. There is no indication that these bacteria are concerned in the ætiology of byssinosis or constitute a special risk to persons exposed to the dust. The predominant genera of fungi were *Aspergillus*, especially *A. niger*, and *Penicillium*. On the whole the bacterial and fungal flora was similar for cotton of different grades and origins. The possible relation of dead and viable microorganisms in dust to the ætiology of byssinosis has yet to be determined.

Public Health Aspects of Weight Control.

L. BRESLOW (*American Journal of Public Health and The Nation's Health*, September, 1952) compares the death rates of males over forty-five years of age in a number of countries. He states that this rate is significantly higher in the United States. The difference is greatest in the earlier age groups, and it is chiefly accounted for by the cardiovascular and renal diseases death rates. A gradual increase in these rates has been apparent in the United States since 1920. The author suggests that epidemiological investigations of cardiovascular and renal diseases would assist in discovering the causes of the increased rates and enable control measures to be taken. Investigations by the Metropolitan Life Insurance Company indicate that there is an association between overweight and excessive mortality, and especially mortality from organic heart disease, cerebral hæmorrhage, nephritis and diabetes. These investigations also show that the death rates from these diseases are less among those who are underweight than among those who are considered to be of normal weight in the United States. A third conclusion from these investigations is that the mortality rates from these diseases tend to decrease if the weight is reduced. The author suggests two methods to establish weight control. The first is to educate the public that weight control by individual effort is necessary for good health. The second is the group method of weight control. Groups of overweight people meet regularly under the leadership of a member of a hospital or health department staff and through the influence and stimulus of the group attempt to reduce weight. Measures of overweight itself, the significance of nutritional elements such as cholesterol and long-term observation of individuals who gain, maintain or lose weight at different periods of life are subjects for investigation suggested by the author.

A Sampling Procedure for Measuring Industrial Dust Exposure.

P. D. OLDHAM AND S. A. ROACH (*British Journal of Industrial Medicine*, April, 1952) discuss the difficulties in relating the development and progression of pneumonokoniosis over a number of years to the amount of dust in the inhaled air. They consider that any method of estimating the dust exposure of workmen for correlation with the incidence of pneumonokoniosis must satisfy the following criteria: (i) The exposure estimated must be that of the same workmen among whom the incidence of pneumonokoniosis is to be found. (ii) The duration of exposure must be measured as well as the concentration of dust. (iii) Account must be taken of the effects of the variability of exposure, both in duration and in intensity. Evidence is produced showing the errors that can arise from ignoring these criteria, and a new method of dust sampling is described which satisfies them. This method is based on following with a sampling instrument throughout their working day individual workmen chosen by a random principle from all those on whom the incidence of disease is to be measured. A practical example of the use of this method is given, and it is demonstrated that the method is simple to execute and makes the most economical use possible of a given amount of sampling.

Individual Sewage Disposal Systems.

V. G. MACKENZIE (*American Journal of Public Health and The Nation's Health*, April, 1952) discusses the part of individual household sewage disposal systems in American sewage practice. He states that of approximately 92,000,000 people served by sewer systems in 1945 in the United States of America, 17,000,000 were served by individual household systems. This represents about 4,500,000 individual household disposal systems. Less than half of these were installed under the organized control of local or State health authorities. Studies of these systems by the author indicate the wide variation in the amount and composition of wastes from individual households. In a group of 300 residences the average water consumption was 39 gallons *per capita* in winter and 49 gallons in summer, but individual consumption varied from 8 to 226 gallons. Similarly the composition of sewage from individual houses varied with the use of soaps, detergents, garbage grinders, washing machines and water softeners. The removal of suspended solids was taken as the criterion of septic tank performance. Studies indicated that the shape of a 500-gallon septic tank had no effect on its efficiency. Tanks containing two or three compartments were more efficient than single compartment tanks. Various forms of inlet and outlet devices and intercompartment flow connexions were investigated. Tee inlets and outlets and the use of inverted U-bends as intercompartment flow connexions were the most effective. Depth did not affect the efficiency of the tank, but a deeper tank provided greater storage for sludge and allowed for longer intervals between the times of sludge removal. Garbage grinders caused a 50% increase in sludge and scum accumulation. Factors such as the clogging characteristics of the effluent, the volume of liquid, the climate, and the absorption characteristics of the soil were studied in the design of a system for the absorption of septic tank effluent. With regard to the standard percolation test it was found that similar results could be obtained by using four-inch or eight-inch auger soakage holes instead of the standard one foot square dug hole. Effluents containing sodium salts tended to clog the soil more than those containing calcium salts. Approximately 20% to 35% of additional disposal area is necessary to deal with ground garbage-sewage effluent. Effluents containing grease suspended by the action of soap caused greater clogging of the disposal area than effluents containing grease suspended by the action of chemical detergents. The author stresses the fact that a septic tank is not a disposal system, but an important unit in a system in which the objective is the disposal of waste liquid into the ground.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on June 18, 1952, at the Royal Alexandra Hospital for Children, Sydney. The meeting took the form of a series of clinical demonstrations by members of the honorary medical and surgical staff of the hospital. Part of this report appeared in the issue of December 6, 1952.

Congenital Defects of Cranial Nerves.

DR. S. E. J. ROBERTSON showed a female child, aged four years, the second child of a mother whose pregnancy was normal. The patient was born at full term after a normal delivery and weighed nine pounds at birth. At birth she could not suck properly, and even now could take only food that was finely mashed. She could make chewing movements, but could not masticate any solid food like apples. As an infant she used to make use of a finger to move her lower jaw in certain directions. Since birth a weakness of the left side of her face had been noticeable and also inability to close her left eye completely. Her tongue had always been small, and although she had a great deal to say, her speech was almost unintelligible to outsiders because of her inability to pronounce certain consonants requiring firm use of the tongue. She had had several episodes of croup, requiring on one occasion her admission to hospital. She had no loss of the sense of smell and she heard and saw well. Inquiry into the family history revealed no conditions of a similar nature.

On examination of the patient, her pupils reacted to light and accommodation, and her fundi were normal. Upward, downward and medial movements of the eyes were full, but she was unable to move the eyes laterally. She was able to close her jaws, but not against slight resistance, and she could not be made to perform lateral movements of her lower jaw. Sensation over the face appeared intact. She was completely unable to move the left side of her face, including the supraorbital muscles, on that side, and the left eye could not be completely closed. Movement of the upper lid when she moved the jaw ("jaw winking") was not observed. She was able to hear spoken words. Elevation of the palate on phonation was full and equal on both sides. No laryngoscopic examination had been made. There was no weakness of rotation of the head or of elevation of the shoulders. The tongue was bilaterally atrophic and was protruded centrally, but not a normal distance over the teeth. Examination of the remainder of the body revealed no muscular wasting, no loss of muscle power, no alteration in muscle tone and no alteration from the normal of the superficial or deep reflexes. No congenital abnormalities of other organs or the limbs could be detected.

Dr. Robertson said that very little was known of the underlying pathology in congenital defects of cranial nerves, but absence or defective development of the cranial nerve nuclei involved had been found. Selective degeneration of the nerve itself, presumably occurring *in utero*, had been described. The muscles corresponding to the defective nerves were absent, atrophic or replaced by fibrous tissue. The nerves of special sensation (the first, second and eighth) might be involved; but in that case there was usually aplasia of their central pathways. Defects of sensory nerves, other than those of special sensation, had not been described. Any of the twelve pairs of cranial nerves might be affected and the disturbance was noted from birth. The defect might be unilateral or bilateral, and one or more nerves might be involved. The defects remained stationary during life. The most commonly encountered was when the oculomotor nerve was affected, the result being congenital ptosis which was often of a mild degree. The patient shown presented a rare combination of defects with bilateral paresis of the motor portion of the trigeminal, the abducens and the hypoglossal nerves and unilateral paresis of the facial nerve.

Hereditary Ectodermal Dysplasia.

Dr. Robertson's next patient was a female, aged two years and three months. The mother, who had suffered from toxæmia of pregnancy, was delivered at full term, the confinement being normal. The child's progress was usual till the age of six months, when it was noticed that she was peevish and failing to thrive and had almost continuous pyrexia during the summer months. When the weather became cooler she improved and put on weight. She sat unsupported at eight months and walked at sixteen months. During hot weather she had a continuous discharge from the nose, her voice was hoarse with occasional aphonia, and she had some difficulty in swallowing. She could appreciate foods with strong tastes, but did not enjoy those without much flavour. She had not suffered from an unusual amount of diarrhœa and had no difficulty in tolerating the usual infant foods as some such patients did. She suffered constantly from an eczematous rash in the groins, which also appeared on the face when the wind was cold. The mother's first child had been born prematurely, weighed three pounds at birth and died at the age of two days. The third child was now aged eight months and was apparently normal. There was no relevant abnormality to be found in the mother's side of the family. The father, however, had two brothers, aged ten and seven years, who had lost from decay all their permanent teeth which had so far erupted, and were said to have "chalk" teeth. Those were the only ectodermal abnormalities so far discovered in the family history.

On examination, the child was smaller than normal and weighed 22 pounds. Her skin was of good colour and texture, but felt dry. A dry scaly rash was present in both groins. The hair was poor in pigment, very fine in texture, sparse and short. The eyelids and eyebrows appeared normal. The structure of the face did not seem to be different from the ordinary. There were 20 deciduous teeth erupted, of good shape and not decayed. She had no cataracts. The nails were not spoon-shaped, but there was pronounced vertical ridging.

Dr. Robertson said that the condition was a rare one, in which there were abnormalities of structures derived from ectoderm. The method of inheritance was debated, but probably followed Mendelian lines and was not sex-linked. The following abnormalities had been reported. The skin was thin, soft and glossy, and was either hypochromic or hyperpigmented. Sebaceous glands were absent, with resultant dryness and rashes. Sweat glands were often missing, with resultant hyperthermia in hot weather. Mucous membranes might be involved, with the presence of a nasopharyngo-laryngitis in some form. Smell and taste might be absent. The hair was fine and sparse and occasionally absent, most often on the head; but occasionally the eyebrows, the eyelashes, the pubic hair or the axillary hair might be involved. The nails tended to be concave. There might be complete anodontia, or the teeth might be decreased in number, abnormal in shape or position, or affected by early decay. Congenital cataracts had been reported. There were no abnormalities of the central nervous system, and the mentality was normal. The only characteristic non-ectodermal defects were prominence of the supraorbital ridges, flattening of the bridge of the nose and thick protrusive lips. Treatment largely consisted in the avoidance of pyrexia. Most patients eventually learned to disregard it. In hot weather the child should be sponged or bathed often during the day and a cool tiled floor should be available to lie on. If possible an air-conditioned room could be provided for the use of the child.

Mongolism in One of Twins.

Dr. Robertson finally showed a male twin, aged eighteen months, suffering from mongolism. His parents were unrelated, and at the time of the patient's conception the father was aged forty-two years and the mother aged forty years. Four previous children had been born to the parents; all were normal. On the paternal side of the family there was an uncle who had been mentally deficient since birth and who had died in a mental institution at the age of seventy years. The type of mental deficiency from which he suffered could not be ascertained, but it was unlikely that a mongol would have lived to that age. The patient was the product of the mother's fifth pregnancy. She had noticed a white vaginal discharge in the early months only. During the third month she suffered from a febrile illness, severe enough to cause her to call her local doctor; it was characterized by cough, vomiting and pyrexia without a rash, and was diagnosed as influenza. On January 15, 1951, she was confined of twins, both born by the breech. The twin affected by mongolism was a male, the other, a normal female. The child with mongolism required oxygen therapy after birth, was slow to develop, and always limped and was difficult to feed because of his big tongue. His present weight was 16·5 pounds (the normal twin weighed 25 pounds), his height was 27·5 inches (twin 30·5 inches), head circumference was 16·75 inches (twin 18·5 inches). His anterior fontanelle still measured half an inch in diameter. His intraocular distance was one inch and the width of his palpebral fissure was seven-eighths of an inch, but the normal twin had the same measurements in that respect. The patient had pronounced medial epicanthic folds, and palpebral fissures which slanted

upwards to their lateral extremities. His ears were normal in shape but smaller than those of the normal twin. The shape of his hands and fingers appeared to be normal, but he had only one transverse crease, and the axial triradius was in an abnormal position. Only one of his teeth had erupted, while eight were present in the normal twin. His muscle tone was lax and he had a small umbilical hernia. He held his head erect, but could not yet sit unsupported. In other respects no abnormality was found except for brownish hyperkeratosis of the soles of both feet, the causation of which was obscure. There was no clinical evidence of a congenital heart lesion. The blood failed to react to the Wassermann test.

Dr. Robertson said that the twins were presented in support of the theory that mongolism was due to a defect in the germ plasm or to some alteration in a susceptible fœtus during pregnancy. In other words, if the fertilized ova in that mother were both originally normal, it was improbable that endocrine deficiency or infection in the mother during pregnancy could have affected one twin and not the other.

Enuresis and Emotional Disturbance.

DR. MARY CARTER showed several patients suffering from enuresis.

The first patient was a male child, aged eight years and four months. In his case the enuresis was the primary complaint and the emotional disturbance was secondary. The child had first attended the hospital in March, 1950, at the age of six years and four months. He had wet his bed all his life. His mother had not worried about it until she felt that it was worrying him; his young brother and sister had now stopped. The patient had developed asthma over the past twenty months; before that he had been a happy, healthy child. He was now hypersensitive with other children and generally nervous. He was beginning to cling to his mother and be distressed over his bed-wetting. His father, who was unsympathetic, was much older than the mother. The patient had one brother, aged four years, and one sister, aged three years.

In August the bed-wetting was less in quantity, but still occurred every night. In November some dry nights were reported when and after the patient had measles. In January, 1951, bed-wetting occurred only about twice per week, but he regressed until in April it was occurring nearly every night. In April the bed-wetting clinic was started; the patient was made to join the group, as it was thought sensitivity to bed-wetting was making it difficult for him to grow out of it. He attended regularly once a month. There was no improvement until October, when he had one "dry" night; treatment with ephedrine and "Nembutal" was begun, one capsule every night. In November he had eight "dry" nights and in December, 19. In January, 1952, he had 21 "dry" nights; he took ephedrine and "Nembutal" on alternate nights and was told to wash his own sheets and pyjamas if he made them wet. In February he had 29 "dry" nights. (On "wet" nights he did not have ephedrine and "Nembutal".) In March he had one "wet" night after a day of crankiness in the family; treatment with ephedrine and "Nembutal" was stopped altogether. In April he had a slight relapse; he had 17 "dry" nights, and the association between a feeling of well-being and "dry" nights was noticed by his mother. In May he had 20 "dry" nights, and he decided that he would like to take ephedrine and "Nembutal" again. Dr. Carter said that since the patient had joined the group the attacks of asthma had been decreasing in severity; none at all had occurred for the preceding four months.

The next patient shown by Dr. Carter was a girl, aged eleven years and eight months; in her case the primary causes of complaint were emotional disturbance and mental deficiency, the enuresis being secondary. The patient had first attended the hospital on November 23, 1950, at the age of ten years. At that time the complaint was of severe temper tantrums and extreme antisocial behaviour; this was exemplified by the patient's using her own fæces to throw at the neighbours' children, and resulted in ostracism by the neighbours and a feeling of shame in the whole family, especially the parents. The patient also suffered from enuresis and was a failure at school. She was the fifth of a family of six; her home background was good, and she was her father's favourite. Several family bereavements had occurred in the past three years, including the loss of an older brother.

On examination the child was pale, thin and sullen. Her chronological age was ten years, her mental age was estimated at about six years, and her intelligence quotient was about 61. She was emotionally immature and fearful. Treatment consisted in convincing the parents of the child's backwardness and persuading them to regard it as an illness; periodic advice was given in the handling of the child and of the social situations arising in a small-town environment, and encouragement was maintained. The child was removed from school. By January, 1951, the family was slightly happier; it had accepted the situation, and the mother was feeling hopeful. The child was still suffering from enuresis. In April there was an improvement, with one "dry" week. The child felt that she was different from other children, and was advised to start correspondence lessons. By August she was reading and writing and gaining weight; she was friendly and cheerful, and the enuresis had gone. In May, 1952, she was attending an opportunity class and making friends; she could sew and use a machine. Her intelligence quotient was again estimated and found to be 55. Dr. Carter said that the patient was now socially acceptable. She had changed from a non-cooperative, miserable child to a cooperative, happy one. She should be able to do simple routine work under supervision.

Dr. Carter then showed a male child, aged four years and two months, whose primary complaint was an emotional disturbance; the secondary complaint was enuresis, day and night. He had been referred by his kindergarten, and had been first examined in April, 1952, at the age of four years. At that time he was aggressive and non-cooperative at home and at his kindergarten, and wild and rough in play with other children. He had temper tantrums, and enuresis day and night had been present since his birth. His mother, who was one of twins, had an anxiety neurosis, and was introverted, erratic and lacking in confidence to a pathological degree. She had had an extremely strict upbringing and had had a nervous breakdown before marriage; she was continually fearful lest she lose her husband's affection. The father was extroverted and insensitive, but kind and cooperative. The patient had a sister, aged one year and ten months.

Psychotherapy was given to the mother, and weekly interviews were held. The father also was interviewed, so that he might be helped to understand the situation, as was the patient's kindergarten teacher. The child showed improvement at home, being much happier, and in play at the kindergarten. Enuresis during the day decreased; he had an occasional "dry" night, but the mother reported that on all nights he was less wet. Dr. Carter said that the patient's behaviour disorders were considered to be symptomatic of his mother's neurotic personality. She was feeling hopeful, though still far from well, and was getting more satisfaction from her marriage situation.

Dr. Carter's next patient was a boy, aged eight years, whose primary complaint was an epileptic disturbance; enuresis was a secondary complaint. He had first been examined in August, 1951, at the age of seven years and two months. He had been referred by his school teacher; his behaviour at school was fair, but he would not do the work set for him, and failed to respond to punishment. Neither his parents nor his teacher could "make contact" with him. He had suffered from nocturnal enuresis since birth. He was a good mixer. He had recently wandered off after school and been found by the police asleep under a motor-car at about 11 p.m. He came from a good home. His mother was nervous, and a maternal uncle and aunt had had nervous breakdowns. His father had a history of minor epilepsy; one cousin had fits.

On examination, the child was physically normal. An electroencephalogram supported the diagnosis of epilepsy. He was given 0·5 grain of phenobarbital three times a day, and became miserable and unmanageable. He was then referred to the seizure clinic, and given "Dilantin" 0·5 grain four times a day. On June 12, 1952, his mother reported that he was "more than normal"; she had tried leaving off the "Dilantin" for two weeks, against advice, and by the end of a week his condition was as bad as ever, but it improved when he was given "Dilantin" again. There was no improvement in his school work, but his general behaviour was good. Dr. Carter said that the fact that the enuresis had not decreased in spite of general improvement called for further investigation. It was suggested that the child should join the bed-wetters' group.

Another patient shown by Dr. Carter was a girl, aged eleven years and five months; an emotional conflict was the primary complaint, enuresis being secondary. She had been referred from the out-patient department, and had first been examined in December, 1951, at the age of ten years and ten months. She had suffered from enuresis since babyhood, and had only occasional "dry" nights. She was a quiet, shy girl, with no other difficulties. She had been adopted at the age of six months, after the birth of a stillborn girl twelve months previously. Her adoptive parents were both alive

and healthy, her home was good, and she had three brothers by adoption, aged twenty-seven, twenty-five and twenty-three years respectively.

On examination, the patient was seen to be well built, and showed signs of the onset of puberty. She was shy and emotionally immature; her intelligence quotient was 118. She had had no sex education of any kind from her mother, who believed her to be ignorant of any suggestion that she was adopted, and even said that the child did not know what "adopted" meant. Though the patient gave no definite information to the contrary, both the psychiatrist and the psychologist had the impression that she knew more than she was prepared to say.

In February, 1952, the patient had her second interview, and had two "dry" nights. She joined the group, and at first was shy and hardly spoke, but each month was readier to discuss her problems. Sex education and the problems of adoption were discussed with the whole group of mothers in the absence of the children, in order that the mother might be helped with her own inhibitions. The problems of puberty were discussed with the patient and her mother together. In March the third interview was held, and the patient had 26 "dry" nights. The mother felt able to discuss adoption with the patient, and did so during the next weeks. This resulted in some disturbance in the patient at first which was reflected by a relapse in bed-wetting; but her condition improved towards the end of the month. In June the sixth interview was held, and the patient had 20 "dry" nights. She was cheerful at the clinic, and was ready to talk and had more self-confidence. Dr. Carter said that the decrease in the patient's enuresis appeared to be related to the resolution of some of her personal problems, but at the same time it was possible that it was actually related to approaching puberty.

Backwardness and Emotional Disturbance.

Dr. Carter then showed a boy, aged nine years and five months, who had been referred from the allergy clinic; he was backward at school and frightened of the dark. He had always been nervous and excitable, and needed a light by which to go to sleep. His father had tried to shame him out of it, but his mother went to the opposite extreme, so that extreme tension was produced in the home. The child was a poor mixer, but played well alone. There was no family history of nervous troubles. The home was unhappy on account of the tension between the parents. The patient had two brothers, aged seventeen and fifteen years respectively. The father was small and aggressive, and the mother was a persistent worrier. The patient had had meningitis at the age of six months; he was said to have been "weakly" for two years afterwards. He had suffered from asthma since the age of two years.

On examination, the child was seen to be thin, pale and nervous, and extremely polite. His intelligence quotient was 88. He was sent to the occupational therapy department on June 26, 1951, where he was found to be extremely lacking in self-confidence and initiative, to have a very short span of concentration, and to be backward in reading. Since then he had continued treatment at that department intermittently, and appeared to be slightly more relaxed; he had been doing some constructive work. On April 29, 1952, psychotherapy through reading was started.

Dr. Carter said that the boy was slightly backward, but not sufficiently so to account for his retardation in reading. His emotional disturbance appeared to be related to the home background. His mother was seeking from him the emotional satisfaction which she had failed to get from her husband. Her over-protective attitude was preventing the child's natural progress to maturity. Treatment was aimed at the weaning of the patient from his mother, and his acceptance by his mother as a separate growing individual. Reading was used as one approach.

Dr. Carter's next patient was a boy, aged fourteen years, who had been referred because of backwardness in reading. He had been first examined on July 20, 1948, at the age of ten years and one month. He was nervous about such things as travelling alone on trams, lost heart if anything was too difficult for him, and was a poor mixer. He was in Class IIIA, one year behind normal, but could hardly read at all. He had four sisters, aged respectively eight, five and three years, and ten months. The sister aged eight years was backward, and one paternal aunt had had a nervous breakdown. There was some family tension over the oldest girl.

On examination, the boy was pale, and tremor of the tongue and fingers was noticed. His intelligence quotient was 104; his reading was about four years behind normal. He showed sudden pallor, tremor and cold sweat when he came upon a word that he could not read. Psychotherapy, mainly through reading, was continued over a period of about two years. At the end of the treatment he was able to read aloud to a whole lecture theatre full of students. He had qualified for entrance to a technical college and was doing well there; he liked football and enjoyed being a member of the Saint John Ambulance Association.

The last patient shown by Dr. Carter was a girl, aged twelve years and two months, who had been referred by Dr. Miles. She had been first examined on June 2, 1949, when the complaint was of excessive shyness of six months' duration; she would not mix with or even look at other people, even though her mother insisted that she was normal at home with the family. She was the younger of two girls, the other being aged twenty-three years. The father was aged about seventy years and the mother about fifty. The father was bedridden with some type of disease of the foot. The child's home was poor and shabby, in a wild overgrown paddock. She had been shy all her life, and had congenital heart disease.

On examination, the patient sat in a katatonic trance-like state, and was inaccessible to psychological examination. No abnormality of the nervous system was detected. Examination of her heart revealed a murmur suggestive of a congenital septal defect. Electrocardiography and X-ray examination revealed no abnormality. Dr. Carter said that the question under consideration was whether convulsive or insulin treatment should be given.

Neonatal Convulsions with Jaundice and Genital Abnormality.

DR. S. E. L. STENING discussed the case of an infant, baptised as a male, which had been admitted to hospital on March 28, 1952, at the age of four days, with the provisional diagnosis of neonatal convulsions, jaundice, and abnormality of the genitalia. The baby was the second in the family, the first having died eighteen months earlier at the age of six weeks, with a similar genital abnormality. The mother's pregnancy had been normal. The baby's birth weight was not known. The abnormal genitalia had been noted at birth. Twenty-four hours before admission to hospital the baby had begun to have cyanotic attacks, and convulsions had been occurring intermittently for the twelve hours preceding admission.

On examination, the infant was deeply jaundiced. The umbilicus was infected and the odour was offensive, the spleen and liver were impalpable, and no abdominal masses were found. Examination of the external genitalia revealed a hypospadic deformity of the "penis". No other abnormality was detected. A number of investigations were carried out, with the following results. The erythrocytes numbered 4,880,000 per cubic millimetre of blood and the hæmoglobin value was 20·3 grammes *per centum*. The child was of blood group A (II) and Rh-positive. Coombs's test produced a negative result. The mother was of blood group A (II) and Rh-positive; she gave a negative response to the indirect Coombs test. The child's blood sugar content was 130 milligrammes per 100 millilitres; it later fell to 98 milligrammes per 100 millilitres. The urine was alkaline and contained a faint trace of glucose, bile pigments and up to three leucocytes per high-power field; it yielded a moderate growth of *Bacillus coli* on culture. The cerebro-spinal fluid was blood-stained; the supernatant was clear. The fluid contained 4500 erythrocytes and four polymorphonuclear leucocytes per cubic millimetre and 60 milligrammes of protein per 100 millilitres. Glucose was present, but no test for chloride was carried out as the quantity of fluid was insufficient. Material from the umbilicus yielded a profuse growth of *Staphylococcus aureus* on culture; the organism was coagulase-positive, and sensitive to streptomycin, aureomycin, "Chloromycetin" and terramycin.

Dr. Stening said that at first the patient was treated as suffering from umbilical sepsis, which was undoubtedly the case. Streptomycin and later "Chloromycetin" were used until the thirteenth day in hospital, when the umbilicus had healed and evidence of infection was absent. Efforts to identify the reducing substance in the urine were continued. Vomiting was a feature of the illness from the day of the child's admission to hospital. The convulsive turns ceased after the lumbar puncture. Thus, when the septic process was under control and vomiting continued, reassessment of the case became necessary. The absence of testes and the solid "penis" with a urethral orifice opening below the base were consistent with a diagnosis of pseudohermaphroditism. On the assumption that this was the correct state of affairs, and in the knowledge that such infants suffered from

hypoadrenalism with vomiting and collapse, treatment with "Eschatin", five millilitres given initially followed by 2·5 millilitres every six hours by intramuscular injection, was begun on the child's fourteenth day in hospital. One gramme of salt was added to the daily diet. Vomiting decreased immediately, and the infant appeared more alert, stronger and very much better in every way. In a few days vomiting had ceased altogether; the infant continued to improve but still lost weight. The dosage of "Eschatin" was reduced on the twenty-first day in hospital to 1·5 millilitres twice a day, and on the twenty-third day to 1·5 millilitres once a day. Two days later the administration of "Eschatin" was suspended. On the following day the infant appeared "not so bright" and vomited small amounts. By that afternoon tube feeding was necessary, since the child was "pale and flat". "Eschatin" therapy was then resumed, but the vomiting increased. The infant died on the twenty-seventh day in hospital, at the age of thirty-one days. Autopsy revealed female pseudohermaphroditism due to adrenal hyperplasia, and bilateral pyelonephritis.

Adrenal Hyperplasia.

Dr. Stening's next patient was a boy, aged five years, suffering from adrenal hyperplasia. His maternal grandmother had diabetes. His one sibling had required three months' care in a mothercraft home on account of malnutrition. The patient had suffered from recurrent sore throats, and in 1949 had had an illness which seemed to be diphtheria. He had undergone tonsillectomy and adenoidectomy in 1949, and had suffered from virus pneumonia three weeks before his first admission to hospital in 1950. His mother's pregnancy had been normal, but he had had a difficult birth with the use of instruments. The baby was two weeks overdue, and suffered bruises to the right side of his head and face and a fracture of the right arm. His birth weight was 10 pounds 14 ounces. As an infant he had progressed well in spite of his injuries, and had been breast fed for eleven months. He had always been large in stature. In 1949 it was noticed that he was growing more rapidly and that pubic hair was appearing. His voice became somewhat deeper during 1950. Those symptoms and signs had increased up to the time of the meeting. He suffered frequent attacks of sudden vomiting, prostration and high fever; they were usually self-limited to about four days. During the attacks he was helpless and appeared to be only semi-conscious. He had been first admitted to hospital in August, 1950, for one of those attacks, at the age of three and a half years. Investigations and observations suggested adrenal hyperplasia and tumour, and in February, 1952, a bilateral exposure of the adrenals was performed by Dr. Eric Goulston. Both adrenals were enlarged and hyperplastic, and a biopsy specimen was taken from the right side. Since then his progress had been unaltered. He had continued to increase in masculinity, height and weight. His attacks of fever and vomiting continued and were becoming more frequent. Schooling was impossible, since he was the butt of his fellows. It was obvious that psychological problems were arising which were severe enough for him to have to be kept within the confines of his family. There had been no evidence of increased or developed libido.

Examination of the boy showed his advanced somatic age; his height was four feet nine inches. His advanced sexual age was shown by the development of the genitals. Pubic hair was present, his voice was deep and his complexion was ruddy. Pigmentation of the penis and scrotum was present, and the scrotal skin was mature. His systolic blood pressure had been as high as 140 millimetres of mercury, but now varied between 120 and 100 millimetres. The optic disks and fundi had always been normal. The testes appeared to be of normal size for his age. No tumours had been palpated. A number of investigations had been carried out. The findings on electrocardiographic and electroencephalographic examination and on examination of the cerebro-spinal fluid were normal. The amount of 17-ketosteroids excreted in the urine was 97 milligrammes per twenty-four hours in 1950; the corresponding figures for 1951 and 1952 were 58 and 67·5 milligrammes respectively. The blood sugar content varied from 85 to 133 milligrammes *per centum* and the blood urea content was 38 milligrammes *per centum*. Blood counts repeatedly gave normal figures except when an attack was present; there might then be signs of hæmoconcentration and infection. X-ray examination for the determination of the patient's osseous age was carried out in June, 1951; his chronological age was then four and a half years and his osseous age twelve to fourteen years, and on March 20, 1952, when he was five years old, his osseous age was fifteen years. The Wassermann test failed to produce a reaction. X-ray examinations of his skull, chest and abdomen, and excretion pyelography, failed to reveal any abnormality. The serum sodium, potassium, chloride and protein contents were within normal limits. The urine and the results of urea concentration tests and concentration and dilution tests were always normal.

Dr. R. D. K. REYE examined the biopsy specimen and reported on it in the following terms. It was a flat portion of adrenal tissue measuring 2·0 by 0·6 by 0·2 centimetres, and had a narrow central zone of a dirty green colour enclosed by two thicker dark tan layers. Microscopic examination revealed no overall increase in thickness of the cortex, and the glomerular zone was normal. The fascicular and reticular zones, on the other hand, were atypical. The majority of the cells in those zones had a deeply staining opaque cytoplasm, and often the cells had only an ill-defined border, while in some instances there were multinucleated masses of cytoplasm without cell division. Pyknosis and nuclear pallor were common, while in the deeper parts brown pigment granules were abundant. Dr. Reye stated that those cells were strongly fuchsinophile, but no special importance should be attached to that finding. He made the comment that despite the absence of any overall thickness of the cortex to indicate cellular hyperplasia, there were certain significant departures from normal in the gland. The dark tan to green colour of the fresh specimen was worthy of notice, and the altered character of the cells comprising all but the glomerular zone might be interpreted as due to hyperplasia of the reticular zone at the expense of the normal fascicular tissue. The histological changes present there were those commonly found in cases in which the entire adrenal was larger than normal. The diagnosis was excess of "androgenic" tissue.

A Case for Investigation.

Dr. Stening finally discussed the case of a male baby who had been admitted to hospital at the age of sixteen days on March 27, 1952. He was a first baby and had been born after a normal pregnancy; his birth weight was six pounds six ounces. *Liquor amnii* had drained for two days before the onset of labour, which lasted for only one and a half hours. Forceps were used to lift the fœtal head through the outlet. The baby fed poorly and vomited occasionally, and his weight dropped to five pounds fourteen and a half ounces. No abnormality was detected on examination, and he was discharged from hospital on the twelfth day. On the fourteenth day he vomited all his feedings, so he was given two millilitres of "Eumydrin" (1 in 2000) before each feeding. He continued to vomit and was readmitted to the country hospital. Thereupon he suffered a cyanotic attack for which "Anacardone", "Synkamine" and penicillin were given. He was apparently in a state of collapse.

On the day of his admission to hospital the baby vomited some black fluid. There had been no abdominal distension or bulging of the fontanelle. His temperature was normal on the day of his admission to hospital. The mother said that the baby had been listless and fatigued at birth, too exhausted to breast feed. At some feeds he was stronger than at others, but he tired after five minutes. The mother's breast milk supply was adequate. Jaundice of moderate degree had been noted on the third day. The baby had retained his feeds for two days after discharge from hospital at the age of twelve days, but then vomiting recommenced. No cough or wheezing had been present. The vomitus at first contained undigested food, but later much sticky mucus was present, while on the day of the child's admission to hospital the vomitus was dark.

On examination of the baby, the fontanelle was seen to be slightly depressed. He felt hot, and his temperature was 101·4° F. A small amount of dark material was present on his upper lip. The liver edge was palpable, but there were no masses; slight abdominal distension was present. The skin was lax, there was little subcutaneous fat, and the tone was poor. No other abnormality was detected on physical examination. A provisional diagnosis of high intestinal obstruction, possibly volvulus, was made; but an X-ray examination of the chest and abdomen (with the patient in the erect posture for the latter) failed to reveal any evidence of obstruction. Meanwhile the administration of glucose (5%) in one-fifth normal saline by the intravenous drip method was begun. Vomiting ceased, but some twitching of the arms was noted. Lumbar puncture produced some blood-stained fluid, which cleared immediately, and which gave essentially normal results on pathological examination. The hæmoglobin value of the child's blood was 18·8 grammes per 100 millilitres. Vomiting of small amounts began again on the second day in hospital, and continued, but the child's general condition was much improved. After the lumbar puncture no further twitching occurred. The child was breast feeding satisfactorily, and a small amount of weight

was gained. Vomiting ceased on the seventh day in hospital, but recommenced again suddenly on the tenth day and rapidly increased in amount, so that within twenty-four hours the infant had become dehydrated once more. Intravenous therapy was recommenced.

On the twelfth day in hospital the infant suddenly collapsed after a vomiting episode; resuscitation was successful. The diagnosis was again considered to be high intestinal obstruction, the collapse being due to inhaled vomitus. Laparotomy, after X-ray examination of the abdomen and further resuscitation of the infant, was scheduled for the following morning. However, the child's condition failed to improve sufficiently; brown fluid was being vomited, the abdomen became distended and constipation was present. He again collapsed in the X-ray room. Deterioration continued until death occurred on the fourteenth day in hospital, the infant then being aged thirty days. Autopsy revealed bilateral adrenal hyperplasia, hypoadrenalism with adrenal failure and hypertrophy of the prostate.

Osteomyelitis of Vertebra with Extradural Abscess.

DR. T. Y. NELSON showed a male patient, aged three and a half years, who had been admitted to hospital on February 15, 1952, with the provisional diagnosis of poliomyelitis. The child had been irritable and feverish for four days, and had had "pins and needles" in the right arm for three days; he was constipated—the bowels had not been open for three days. For three days he had been holding his back rigid and resenting movement. There was nothing relevant in the child's previous clinical or family history.

On examination of the boy, his temperature was 100° F.; he was crying and resented any examination. Some neck stiffness was present, but Kernig's sign was absent; the sensory, motor and reflex functions were all normal. No abnormality was detected in the chest, the central nervous system, the abdomen, the fauces, the ears or the lymphatics. Lumbar puncture produced clear fluid which flowed freely. It contained 50 milligrammes of protein *per centum*, 760 milligrammes of chloride *per centum*, and two cells per cubic millimetre, both polymorphonuclear leucocytes; no glucose was detected.

On February 18 the child's temperature rose to 103° F., and the left knee jerk was absent. Lumbar puncture was repeated; the cerebro-spinal fluid was yellow, and contained one gramme of protein and 720 milligrammes of chloride *per centum*; the cell content was 116 leucocytes per cubic millimetre, 56% being polymorphonuclear cells and 44% mononuclear cells; there were 210 erythrocytes per cubic millimetre. On February 20 a mass was palpable in the right paravertebral region at the level of the fourth thoracic vertebra. Neither the Wassermann nor the Kline test produced a reaction, and there was a negative response to the Mantoux test. X-ray examination revealed no evidence of abnormality in the cervical, dorsal or lumbar portions of the spine, the chest or the skull.

On February 21 Babinski's reflex was present on the left side. The patient was examined by the honorary surgeon, who recommended the taking of a myelogram, and laminectomy. Lumbar puncture was repeated and yellow fluid was obtained; the pressure was not high enough to register on the manometer. There was a negative response to the Queckenstedt test. Cisternal puncture produced clear fluid under a pressure of 220 millimetres; the Queckenstedt test produced a positive response. Examination of the fluid obtained by lumbar puncture showed it to contain 2·4 grammes *per centum* of protein and 76 leucocytes (72% mononuclear cells) per cubic millimetre. Examination of the fluid obtained by cisternal puncture showed it to contain 10 milligrammes *per centum* of protein and one mononuclear leucocyte per cubic millimetre.

On February 24 acute retention of urine developed, and suprapubic cystotomy was performed. On February 27 cisternal puncture and myelography revealed a complete block at the level of the first thoracic vertebra. Upper dorsal laminectomy, performed immediately after myelography, revealed an epidural abscess, which was drained. This communicated with the mass in the scapular region, which was also drained. Penicillin therapy was commenced.

On February 28, the day after operation, there was some improvement in leg movements, and gradual improvement continued. The abscess drain tube was removed on the second day, and the suprapubic catheter on March 16. Apart from a urinary infection, which responded rapidly to the administration of alkali and sulphonamide, convalescence was uneventful until the patient's discharge from hospital on May 6. At that time all limbs were moving easily and the child was walking well. An X-ray examination of the cervical part of the spine on March 10 revealed no definite evidence of bone destruction, but it was pointed out that the region was difficult to examine radiologically, and some bone destruction could not be excluded. The disk spaces were of normal thickness.

Dr. Nelson said that the child was thought possibly to have a spinal tumour, which had produced a rapid block in the spinal theca with signs of cord compression. The mass noted in the scapular region did not suggest an acute inflammatory mass, which it had proved to be at operation; but in retrospect the acuteness of the illness and the rapid march of events should have suggested the condition. It was of interest that at the time of the meeting there was in the hospital another child, aged eight months, in whom an extradural abscess presumably resulting from osteomyelitis of a vertebra had been accidentally discovered by the observation of pus coming from the lumbar puncture needles inserted for a diagnostic puncture. That child had developed no cord signs, as the abscess was promptly drained, and recovery was rapid.

(To be continued.)

VICTORIAN BRANCH NEWS.

THE following results of the ballot for the 1953 Council are published at the request of the Medical Secretary of the Victorian Branch.

Place.	Name.	Number of Votes.
1.	Hurley, Victor	730
2.	Southby, Robert	727
3.	MacCallum, P.	648
4.	Norris, F. Kingsley	643
5.	Byrne, Charles	628
6.	James, H. Maxwell	618
7.	Lindell, J. H.	581
8.	Hallam, Keith H.	570
9.	Rank, B. K.	568
10.	Johnston, Leonard W.	565
11.	Furnell, H. G.	544
12.	Kent Hughes, M. O.	535
13.	Hiller, Henry G.	493
14.	Collins, V. L.	489
15.	King, W. E.	472
16.	Melville, A. H.	471
17.	Hurley, J. G.	455
18.	Brown, Grayton	443
19.	Jens, John	367
20.	Carrington, W. L.	345
	Number of ballot papers counted	778
	Informal ballot papers	8

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

MEDICAL WOMEN.[1]

[*Australian Medical Journal*, July, 1865.]

The Medical Board of Victoria has been startled from its routine by the application of a lady to have her name placed on the Register. As may be supposed—indeed it may be assumed as a matter of course—she comes from America where exceptional social phenomena of all kinds are to be found: where women's rights are recognized, where bloomerism was invented, where women preach, lecture, edit newspapers, sit upon high stools in offices and in a general way, insist on doing what is done for them in less advanced communities. It is remotely possible that the prevailing objection to this assumption of duties usually assigned to the other sex, is the result of narrow prejudice, which refuses to comprehend all the vast capabilities of women's character. Until, however, we have reached that perfect social economy in which the sexes are to be confounded, or rather, perhaps, in which the relative inferiority of the male sex is to be demonstrated, it is not possible to look upon lady-physicians

[1] From the original in the Mitchell Library, Sydney.

as other than curious examples of exceptional idiosyncrasy. No doubt it requires a peculiar condition of the moral sense, or a special concurrence of favouring circumstances to produce the medical-woman. The duties for which women are commonly supposed to be naturally qualified presuppose a certain mental fitness, the very opposite of that which furnishes the substratum of the medical woman. There is no necessary antagonism between the domestic virtues and literary or scientific studies, so long as these are studies pure and simple and do not carry the student into the responsibilities and anxieties of their professional application: but when they are thus pursued beyond the boundary that separates the abstract from the practical, they undoubtedly suggest an incompatibility with the duties of home existence, and a woman who has voluntarily devoted herself to a state in which the abandonment of the domestic qualification seems a necessity, is a being whom men do not love and with whom women can hardly sympathize.

A great deal of flatulent eloquence has been expended by the champions of so-called women's rights, in an endeavour to prove that the healing art is peculiarly fitted to display the qualities of benevolence and kindliness, essentially belonging to the female character: and they tell us how in the dark ages, when pathology was yet unknown, and the elements of therapeutics had not yet coalesced into a science, of women travelling about the world with balsams, oils, herbs, and adhesive plaster, ministering to the sick and wounded, and exercising their skill without the certificate of boards or councils, and that therefore it would be well to restore to the sex this social right of medical practice and bring back a custom so heaven-inspired. Moreover, as a further argument, they point exultingly to a benevolent lady, who, at the sacrifice of much comfort and personal convenience, went to the war in our own times, in order that the hospital comforts of wounded soldiers should be thoroughly looked to. But the medical women of the middle ages already have their representatives in these days. It is a weakness with many ladies, who have reached the leisure time on the other side of middle life, to prescribe physic for their neighbours. There is not much harm done by this playing at doctoring, and the medical lady-physicians were probably not much more mischievous than the matrons of our own day. Of Miss Nightingale there is no true woman who would not be glad to learn a lesson from her. Ministrations such as she performed are not only strictly within the limits that bound the domestic virtues, but they are among the most exalted of these. The sick chamber is desolate if there be no women in it to perform the thousand little offices necessitated by the helplessness that disease creates. But a woman who dissects, who makes post mortem examinations, who tests urine, who perhaps carries diseased specimens in her dress pocket, who can pass the male catheter and introduce bougies, who has perhaps performed lithotomy, who punctures buboes, probes sinuses, examines dejects, sputa and purulent discharges, applies ligatures to hæmorrhoids and may have just come from operating for fistula-in-ano is not a person in whom you would look for the tenderer domestic qualities. It is too much forgotten that the duties of the surgeon are, many of them, extremely repulsive and that not seldom even strong men recoil from them. The necessity for their performance makes us forget how repulsive they are. But it is abhorrent to the sense of delicacy that women in whom delicacy is a constituent rather than a quality, should desire to perform them.

There is little fear that in any British community medical women will exist as a class. They will occasionally be imported, like other curiosities, and the public will wonder at them just as it wonders at dancing dogs, fat boys and bearded ladies, and, in accordance with the demand for novelties, they will, perhaps, be as successful in a material sense, but they are not likely to be included in the list of British institutions.

Correspondence.

THE AUSTRALIAN ABORIGINAL AND OURSELVES.

SIR: There are a few points in Dr. J. B. Hogg's letter in the last issue of the journal that call for comment, though, of course, I do not dispute his right of criticizing an editorial which seemed to me an intelligent and civilized approach to the difficulties of finding the right way of treating our few remaining aborigines.

It was probably inevitable that with the colonization of Australia and the clash of two such incompatible ways of

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED NOVEMBER 15, 1952.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	4	..	..	..	..	..	..	4
Amœbiasis	..	3(2)	..	..	..	..	..	..	3
Ancylostomiasis	..	..	29(29)	..	..	..	..	..	29
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1	..	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	4(3)	6(6)	..	..	2(2)	1	..	..	13
Diphtheria	9(3)	1(1)	2(1)	..	5(4)	2(2)	..	..	19
Dysentery (Bacillary)	..	2(1)	..	..	1(1)	..	..	1	4
Encephalitis	..	1	..	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	..	17(5)	..	..	20(10)	..	..	..	37
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	6	..	..	..	6
Leptospirosis	..	..	3	..	..	..	..	..	3
Malaria	..	1(1)	2(2)	..	..	..	..	..	3
Meningococcal Infection	1	1	..	1(1)	..	1	..	..	4
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	1	..	..	..	..	..	..	..	1
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	9(5)	14(3)	3	10(7)	..	1	..	..	37
Puerperal Fever	..	1	..	..	..	..	..	..	1
Rubella	..	169(115)	1(1)	..	2	..	..	1	173
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	19(14)	27(21)	4(1)	5(2)	4(3)	4(3)	..	..	63
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	2	..	2(2)	..	..	..	4
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	43(27)	11(7)	9(8)	8(5)	11(7)	2(1)	2	..	86
Typhoid Fever	..	1	..	..	1(1)	..	..	..	2
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

life the aborigines should suffer hardships and injustices. Their existence as nomadic hunters, needing large areas over which to roam, and the inviolable law which forbade one tribe to enter the lands of another without express permission, made it impossible to occupy their country without disrupting their lives.

But undoubtedly the failure to understand that they had a social order of their own and a quite highly organized art of living led to their being unnecessarily despised and regarded as "fauna rather than inhabitants"; and so they were treated as fauna, to be exterminated when they became a nuisance to the settler. It was this attitude of mind that made possible the shocking Myall Creek massacre, when at least 28 men, women and children were rounded up and murdered. The murderers were genuinely astonished and aggrieved when punished—they had looked on their victims as "fauna". The same idea was probably responsible for the numerous cases of killing of groups of aborigines who came to stations asking for food, and were given poisoned flour.

There are two ways of looking at their failure to "influence their environment". It can be seen as a failure in initiative, or as fitting themselves into a natural community so well that after living here for thousands of years they had done their country no harm whatever; while we, with our restless and often unwise initiative, have so influenced our environment that in a century and a half we have damaged or destroyed millions of acres of once good soil. I think that we have done this, not only from a greed for quick riches, but from a failure to realize that we are one part of the cycle of life and death that makes up the soil community, and that we must care for the soil as for ourselves.

It has too often been the fashion to look on the aboriginal with contempt because he lived as a nomadic hunter; but how else might he live, with no animals that could be usefully domesticated and no plants that could be usefully cultivated?

I do not know what criteria should be used in grading social systems, but considering their environment, the aborigines' social system was materially about as good as might be expected, while spiritually it had many surprising excellences. They had firm spiritual beliefs; they had a rich and fascinating folk-lore; they had an extensive and exact system of laws which bound their lives successfully to their environment; they had a highly stylized pictorial art and expressionist dances which are the delight of many connoisseurs—Mr. Ted Shawn, a world authority on the dance, not long ago saw corroborees and was filled with admiration of the dancing, noting two aborigines in particular, who, he stated, were equal to the world's best; they had their song makers, and all the evidence goes to show that they were a happy people. Charles Sturt, after listening to them singing and talking and laughing most of a night round the camp fires, remarks, "they are a merry folk". Another of our writers has said that while we have mastered the technique of living, they had mastered the art of living. And with all our marvellous techniques, are we a happy people, or do we walk in the shadow of fear?

A few years ago, in the centre of Australia, I saw the paintings of the aborigines at the Hermansburg Mission; there were then about a dozen of them painting, and one of the points that struck me was that they were not merely following Namatjira, but were evolving individual styles. At Alice Springs I was told that aboriginal and half-caste children showed just as much intelligence in learning as the whites, up to the age of about twelve; then their interest seemed to fade. The reason suggested for this was that about then they began to realize that there was no place for them in our society but to be hewers of wood and drawers of water.

If that can be altered, and a way found of bringing them into our community, I think it is certain that they have a valuable contribution to make to our civilization, especially perhaps in helping us to feel at one with our soil, so that we may become genuinely part of Australia.

Yours, etc.,

E. P. DARK.

Katoomba,
New South Wales,
December 2, 1952.

Obituary.

KENNETH ROY TREMBATH.

We regret to announce the death of Dr. Kenneth Roy Trembath, which occurred on November 23, 1952, at Murchison, Victoria.

JOHN GERALD LENTAIGNE.

We regret to announce the death of Dr. John Gerald Lentaigne, which occurred on November 30, 1952, at Lismore, New South Wales.

Corrigendum.

The footnote to the book review entitled "Aviation Medicine" on page 883 of this issue is incorrect. It should be as follows:

[1] "Principles and Practice of Aviation Medicine", by Harry G. Armstrong, M.D., F.A.C.P.; Third Edition; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" × 6½", pp. 486, with 97 illustrations. Price: 80s. 9d.

Diary for the Month.

JAN. 6.—New South Wales Branch, B.M.A.: Council Quarterly.
JAN. 7.—Western Australian Branch, B.M.A.: Council Meeting.
JAN. 8.—South Australian Branch, B.M.A.: Council Meeting.
JAN. 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

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MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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